TOSHIBA

SERVICE MANUAL

COLOUR TELEVISION

15V31B

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SERVICING NOTICES ON CHECKING

1. KEEP THE NOTICES

As for the places which need special attentions, they are indicated with the labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.

2. AVOID AN ELECTRIC SHOCK

There is a high voltage part inside. Avoid an electric shock while the electric current is flowing.

3. USE THE DESIGNATED PARTS

The parts in this equipment have the specific characters of incombustibility and withstand voltage for safety. Therefore, the part which is replaced should be used the part which has the same character.
Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts as a ⚠ mark, the designated parts must be used.

4. PUT PARTS AND WIRES IN THE ORIGINAL POSITION AFTER ASSEMBLING OR WIRING

There are parts which use the insulation material such as a tube or tape for safety, or which are assembled in the condition that these do not contact with the printed board. The inside wiring is designed not to get closer to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.

5. TAKE CARE TO DEAL WITH THE CATHODE-RAY TUBE

In the condition that an explosion-proof cathode-ray tube is set in this equipment, safety is secured against implosion. However, when removing it or serving from backward, it is dangerous to give a shock. Take enough care to deal with it.

6. AVOID AN X-RAY

Safety is secured against an X-ray by considering about the cathode-ray tube and the high voltage peripheral circuit, etc.
Therefore, when repairing the high voltage peripheral circuit, use the designated parts and make sure not modify the circuit.
Repairing except indicates causes rising of high voltage, and it emits an X-ray from the cathode-ray tube.

7. PERFORM A SAFETY CHECK AFTER SERVICING

Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are the portions which are deteriorated around the serviced places serviced or not. Check the insulation between the antenna terminal or external metal and the AC cord plug blades. And be sure the safety of that.

(INSULATION CHECK PROCEDURE)

1. Unplug the plug from the AC outlet.
2. Remove the antenna terminal on TV and turn on the TV.
3. Insulation resistance between the cord plug terminals and the eternal exposure metal **[Note 2]** should be more than 1M ohm by using the 500V insulation resistance meter **[Note 1]**.
4. If the insulation resistance is less than 1M ohm, the inspection repair should be required.

[Note 1]

If you have not the 500V insulation resistance meter, use a Tester.

[Note 2]

External exposure metal: Antenna terminal
Earphone jack

HOW TO ORDER PARTS

Please include the following informations when you order parts. (Particularly the VERSION LETTER.)

1. MODEL NUMBER and VERSION LETTER
   The MODEL NUMBER can be found on the back of each product and the VERSION LETTER can be found at the end of the SERIAL NUMBER.
2. PART NO. and DESCRIPTION
   You can find it in your SERVICE MANUAL.

IMPORTANT

Inferior silicon grease can damage IC's and transistors.
When replacing an IC's or transistors, use only specified silicon grease (YG6260M).
Remove all old silicon before applying new silicon.

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GENERAL SPECIFICATIONS

G-1	**TV System**	CRT	CRT Size / Visual Size	15 inch / 357mmV
			CRT Type	Flat
			Deflection	90 degree
			Magnetic Field BV/BH	+0.45G/0.18G
		Color System		PAL
		Speaker		1 Speaker
			Position	Front
			Size	1.5 x2.7 Inch
			Impedance	8 ohm
		Sound Output	MAX	5 W
			10%(Typical)	4 W
		DDR SECAM		No
		NTSC3.58(AV)+NTSC4.43		Yes
		PAL60Hz		Yes
G-2	**Tuning System**	Broadcasting System		U.K. System I
		Tuner and Receive CH	System	1Tuner
			Destination	U.K.
			Tuning System	F-Synth
			Input Impedance	VHF/UHF 75 ohm
			CH Coverage	21 - 69
		Intermediate Frequency	Picture(FP)	39.5MHz
			Sound(FS)	33.5MHz
			FP-FS	6.0MHz
		Preset CH		100
		Stereo/Dual TV Sound		No
		Tuner Sound Muting		Yes
G-3	**Power**	Power Source	AC	230V-240V AC 50Hz
			DC	
		Power Consumption	at AC	
				46 W at AC 230 V 50 Hz
			Stand by (at AC)	3 W at AC 230 V 50 Hz
			Per Year	-- kWh/Year
		Protector	Power Fuse	Yes
G-4	**Regulation**		Safety	CE(EN60065:98),BEAB
			Radiation	CE
			X-Radiation	-
G-5	**Temperature**		Operation	+5oC ~ +40oC
			Storage	-20oC ~ +60oC
G-6	**Operating Humidity**			Less than 80% RH

GENERAL SPECIFICATIONS

G-7	**On Screen Display**	Menu			Yes
		Menu Type			Character
		Picture			Yes
			Contrast		Yes
			Brightness		Yes
			Colour		Yes
			Tint (NTSC Only)		Yes
			Sharpness		Yes
		Audio			No
			Bass		No
			Treble		No
			Balance		No
			BBE On/Off		No
			Stable Sound On/Off		No
		CH Tuning			Yes
			Manual		Yes
			Auto		Yes
			CH MAPPING		Yes
			CH Allocation		No
		Language			Yes
		Clock Set			No
		On/OffTimer Set			Yes
		On Timer Set			No
		Pin Code Registration			No
		Panel Lock			Yes
		Nicam Auto Off			No
		AV Colour System			Yes
		Sound System			No
		Auto 4:3 Default			No
		AV2 Output			No
			Output Source		No
			Source		No
		Control Level			Yes
			Volume		Yes
			Brightness		Yes
			Contrast		Yes
			Colour		Yes
			Tint (NTSC Only)		Yes
			Sharpness		Yes
			Tuning		Yes
			Bass		No
			Treble		No
			Balance		No
			Back Light		No
		Nicam ST			No
		Tone 1/2 (A/B)			No
		Surround On/Off			No
		Pin Code			No
		AV			Yes
		Skip			Yes
		Channel			Yes
		Broadcasting Station Name			Yes
		Hotel Lock			No
		Sleep Timer			No
		Selectable Picture			Yes
		Wide Mode			No
		Sound Mute			Yes
G-8	**OSD Language**				English, French, Spanish, German, Italian
G-9	**Clock and Timer**	Sleep Timer	Max Time		- Min
			Step		- Min
		Clock			No
		On Timer	Program(On Timer)		Yes
		Off Timer	Program(Off Timer)		Yes
		Wake Up Timer			No
		Timer Back-up (at Power Off Mode)		more than	-- Min Sec

GENERAL SPECIFICATIONS

G-10	**Remote Control**	Unit		RC-GX
		Glow in Dark Remocon		No
		Format		NEC
		Custom Code		40-BF h
		Power Source	Voltage(D.C)	3V
			UM size x pcs	UM-4 x 2 pcs
		Total Keys		34 Keys
		Keys	Power	Yes
			1/Rename	Yes
			2/Move	Yes
			3	Yes
			4	Yes
			5	Yes
			6	Yes
			7	Yes
			8	Yes
			9	Yes
			0	Yes
			Volume Up / +	Yes
			Volume Down / -	Yes
			Previous	Yes
			Select Picture	Yes
			Menu	Yes
			OK(Enter)	Yes
			EXIT	Yes
			Audio Select	No
			On/OffTimer	Yes
			Mute	Yes
			DSP/surround/Virtual Dolby	No
			Woofer/Bass	No
			Picture Size	No
		T'TEXT Keys	TEXT / MIX / TV	Yes
			CH Up / Page Up	Yes
			CH Down / Page Down	Yes
			Red	Yes
			Green	Yes
			Yellow	Yes
			Cyan	Yes
			TEXT F/T/B	Yes
			Reveal	Yes
			TIMED PAGE(SUB PAGE)	Yes
			CALL / TEXT INDEX	Yes
			INPUT SELECT	Yes
			TEXT HOLD	Yes
			TIME / TXCL	Yes

GENERAL SPECIFICATIONS

G-11	Features	Auto Degauss		Yes
		Auto Shut Off		Yes
		Canal+		No
		CATV		No
		Anti-theft(Back Up 30 Min.)		No
		Memory(Last CH)		Yes
		Memory(Last Volume)		Yes
		BBE		No
		Auto Search		Yes
		CH Allocation		No
		CH MAPPING		Yes
		Just Clock Function		No
		Game Position		No
		CH Label		No
		VM Circuit		No
		Full OSD		No
		Noise Blue Back		No
		T'Text		Yes
			Text type	Fastext
			Text Language	English, French, Swedish, Hungarian Finnish, Turkish, German, Dutch Portuguese, Spanish, Italian, Greek
		Premiere		No
		Comb Filter		No Lines
		Auto CH Memory		No
		Stable Sound		No
		Auto Set Up		Yes
		Protect of FBT Leak Circuit		Yes
		Previous (Quick View)		Yes
		Panel Lock		Yes
		Double Focus & Dynamic Focus		No
		Wss Signal Wide Change		No
		Virtual Dolby Surround		No
		Power ON Memory		Yes
		Hotel Lock		No
G-12	Accessories	Owner's Manual	Language	English
			w/Guarantee Card	No
		Remote Control Unit		Yes
		Rod Antenna		No
			Poles	-
			Terminal	-
		Loop Antenna (W/ Antenna Change Plug)		Yes
			Terminal	D- type
		U/V Mixer		No
		DC Car Cord (Center+)		No
		Guarantee Card		No
		Warning Sheet		No
		Circuit Diagram		No
		Antenna Change Plug		No
		Service Facility List		No
		Important Safeguard		Yes (Owner's Manual In)
		Dew/AHC Caution Sheet		No
		AC Plug Adapter		No
		Quick Set-up Sheet		Yes
		Battery		Yes
			UM size x pcs	UM-4 x 2 pcs
			OEM Brand	No
		AC Cord		No
		AV Cord (2Pin-1Pin)		No
		Registration Card		Yes[From '03 NOV O/R]
		PTB Sheet		No
		300 ohm to 75 ohm Antenna Adapter		No

GENERAL SPECIFICATIONS

G-13	**Interface**	Switch	Front	Power (Tact Sw)	No
				System Select	No
				Main Power SW	Yes
				Sub Power	No
				Channel Up	Yes
				Channel Down	Yes
				Volume Up	Yes
				Volume Down	Yes
			Rear	AC/DC	No
				TV/CATV Selector	No
				Degauss	No
				Main Power SW	No
		Indicator		Power	No
				Stand-by	No
				Stand-by/ON	Yes(Red)
				On Timer	Yes(Green)
		Terminals	Front	Video Input	Yes
				Audio Input	Yes
				Other Terminal	HeadPhone (Mono)
			Rear	Video Input(Rear1)	No
				Video Input(Rear2)	No
				Audio Input(Rear1)	No
				Audio Input(Rear2)	No
				Video Output	No
				Audio Output	No
				Euro Scart(21Pin) S-INPUT	No
				Euro Scart(21Pin) RGB-INPUT	Yes (x1) Yes (x1)
				Component Input	No
				Diversity	No
				Ext Speaker	No
				DC Jack 12V(Center +)	No
				VHF/UHF Antenna Input	D Type
				AC Outlet	No
G-14	**Set Size**			Approx. W x D x H (mm)	366 x 396.7 x 373
G-15	**Weight**			Net (Approx.)	11 .0 kg (--- lbs)
				Gross (Approx.)	13.0kg (---lbs)
G-16	**Carton**		Master Carton		No
				Content	--- Sets
				Material	--- / ---
				Dimensions W x D x H(mm)	---
				Description of Origin	---
			Gift Box		Yes
				Material	Double/Brown
				Dimensions W x D x H(mm)	440 x 472 x 457
				Design	As per Buyer's
				Description of Origin	No (Assembled in UK)
			Drop Test		Natural Dropping At 1 Corner / 3 Edges / 6 Surfaces
				Height (cm)	62
			Container Stuffing		655 Sets/40' container
G-17	**Material**		Cabinet	Front	PS 94HB
				Rear	PS 94V0 NON-HALOGEN
				Holder	PS 94V0 NON-DECABROM
			PCB	Non-Halogen Demand	Yes
				Eyelet Demand	Yes
G-18	**Environment**		Pb Free	Lead-free Solder	No
				Other	No
			Cd Free		No

DISASSEMBLY INSTRUCTIONS

1. REMOVAL OF ANODE CAP

Read the following **NOTED** items before starting work.

* After turning the power off there might still be a potential voltage that is very dangerous. When removing the Anode Cap, make sure to discharge the Anode Cap's potential voltage.
* Do not use pliers to loosen or tighten the Anode Cap terminal, this may cause the spring to be damaged.

REMOVAL

1. Follow the steps as follows to discharge the Anode Cap. **(Refer to Fig. 1-1.)**
   Connect one end of an Alligator Clip to the metal part of a flat-blade screwdriver and the other end to ground.
   While holding the plastic part of the insulated Screwdriver, touch the support of the Anode with the tip of the Screwdriver.
   A cracking noise will be heard as the voltage is discharged.

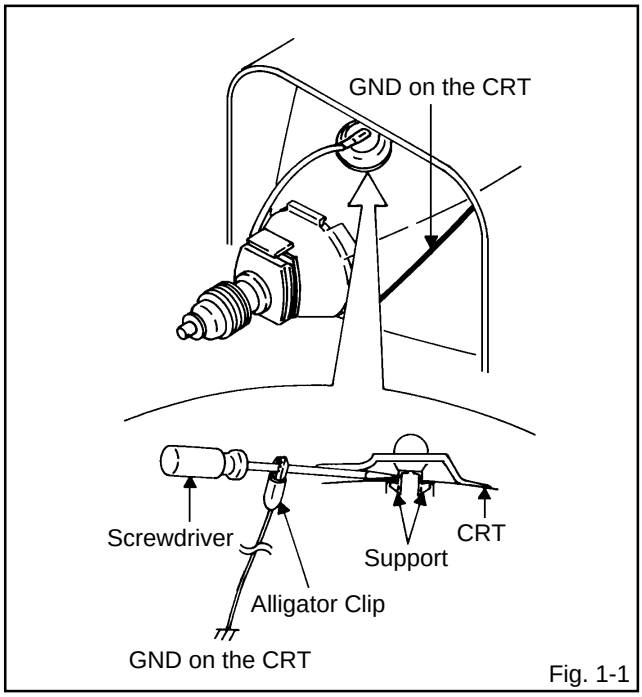


Fig. 1-1

2. Flip up the sides of the Rubber Cap in the direction of the arrow and remove one side of the support. **(Refer to Fig. 1-2.)**

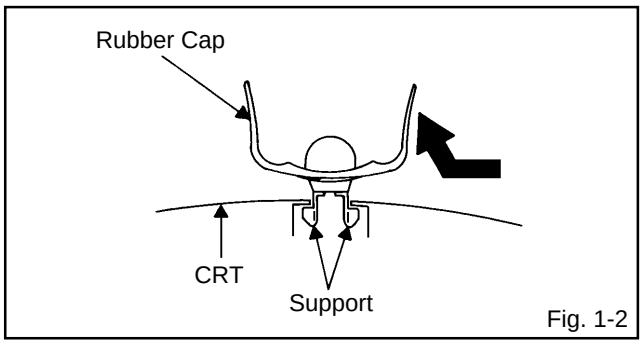


Fig. 1-2

3. After one side is removed, pull in the opposite direction to remove the other.

NOTE

Take care not to damage the Rubber Cap.

INSTALLATION

1. Clean the spot where the cap was located with a small amount of alcohol. **(Refer to Fig. 1-3.)**

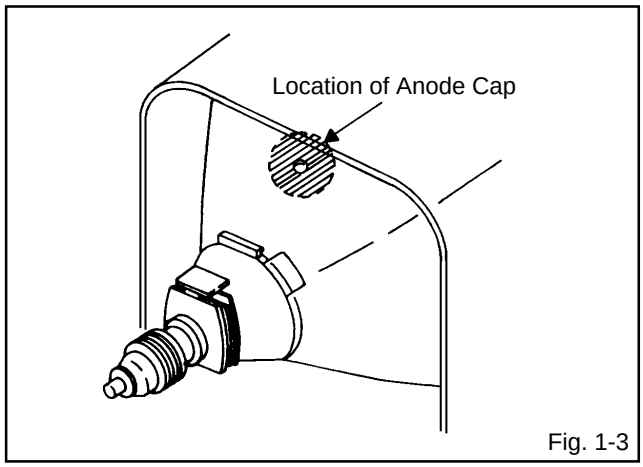


Fig. 1-3

NOTE

Confirm that there is no dirt, dust, etc. at the spot where the cap was located.

2. Arrange the wire of the Anode Cap and make sure the wire is not twisted.
3. Turn over the Rubber Cap. **(Refer to Fig. 1-4.)**

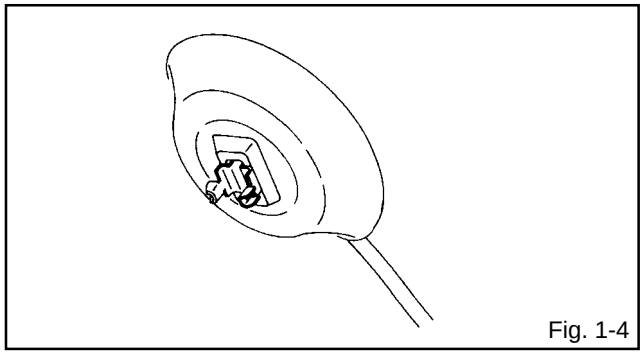


Fig. 1-4

4. Insert one end of the Anode Support into the anode button, then the other as shown in **Fig. 1-5**.

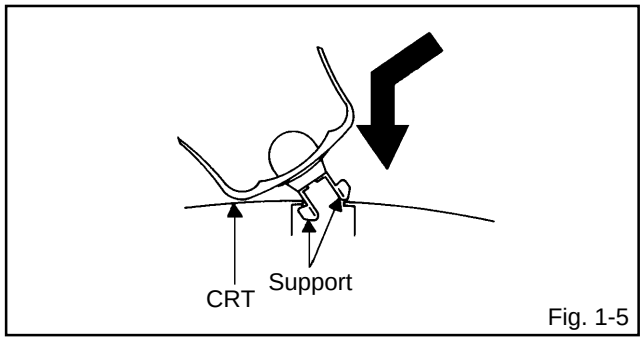


Fig. 1-5

5. Confirm that the Support is securely connected.
6. Put on the Rubber Cap without moving any parts.

DISASSEMBLY INSTRUCTIONS

2. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC

REMOVAL

1. Put the Masking Tape (cotton tape) around the Flat Package IC to protect other parts from any damage. **(Refer to Fig. 2-1.)**

   NOTE

   Masking is carried out on all the parts located within 10 mm distance from IC leads.

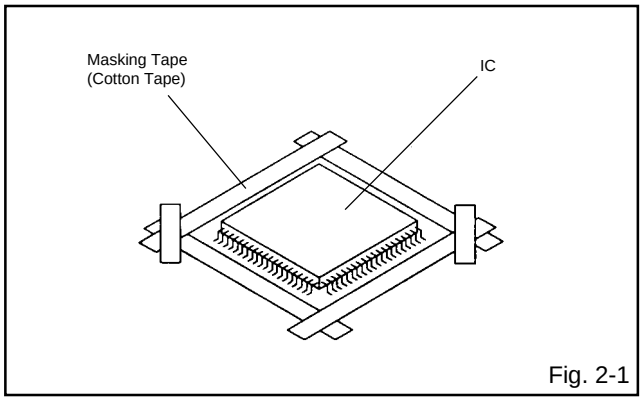


Fig. 2-1

2. Heat the IC leads using a blower type IC desoldering machine. **(Refer to Fig. 2-2.)**

   NOTE

   Do not add the rotating and the back and forth directions force on the IC, until IC can move back and forth easily after desoldering the IC leads completely.

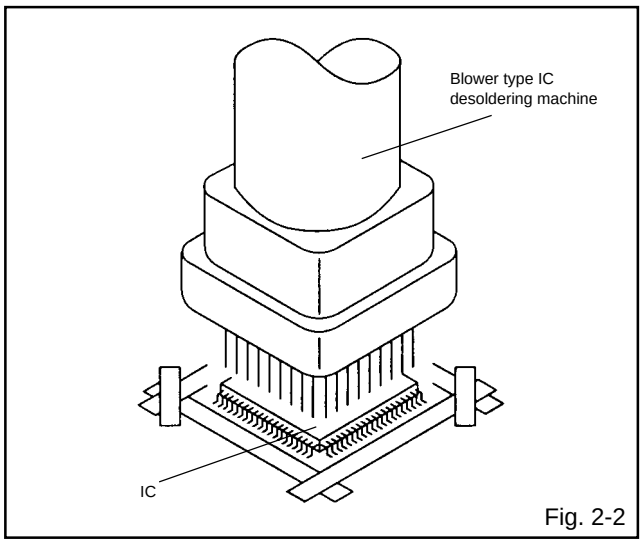


Fig. 2-2

3. When IC starts moving back and forth easily after desoldering completely, pickup the corner of the IC using a tweezers and remove the IC by moving with the IC desoldering machine. **(Refer to Fig. 2-3.)**

   NOTE

   Some ICs on the PCB are affixed with glue, so be careful not to break or damage the foil of each IC leads or solder lands under the IC when removing it.

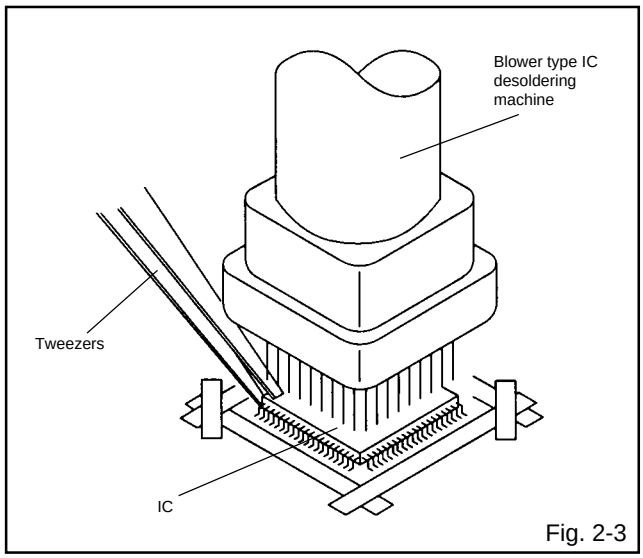


Fig. 2-3

4. Peel off the Masking Tape.

5. Absorb the solder left on the pattern using the Braided Shield Wire. **(Refer to Fig. 2-4.)**

   NOTE

   Do not move the Braided Shield Wire in the vertical direction towards the IC pattern.

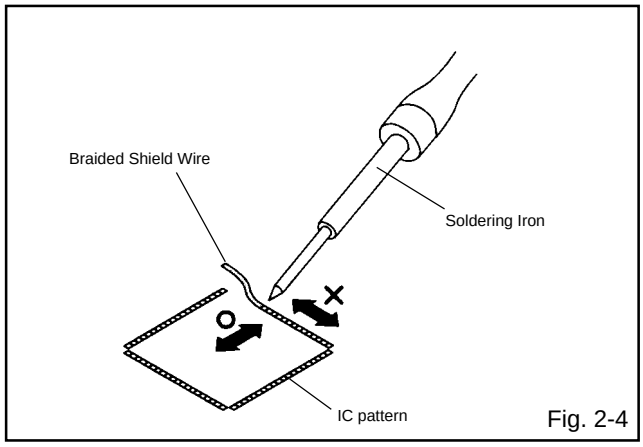


Fig. 2-4

DISASSEMBLY INSTRUCTIONS

INSTALLATION

1. Take care of the polarity of new IC and then install the new IC fitting on the printed circuit pattern. Then solder each lead on the diagonal positions of IC temporarily. **(Refer to Fig. 2-5.)**

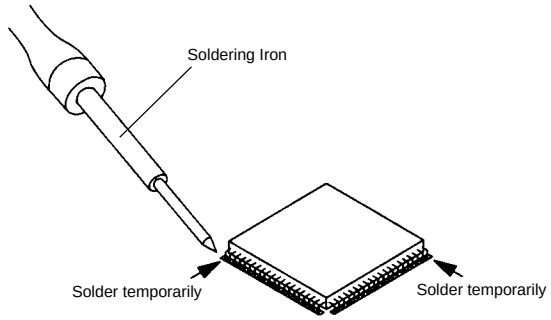


Fig. 2-5

2. Supply the solder from the upper position of IC leads sliding to the lower position of the IC leads. **(Refer to Fig. 2-6.)**

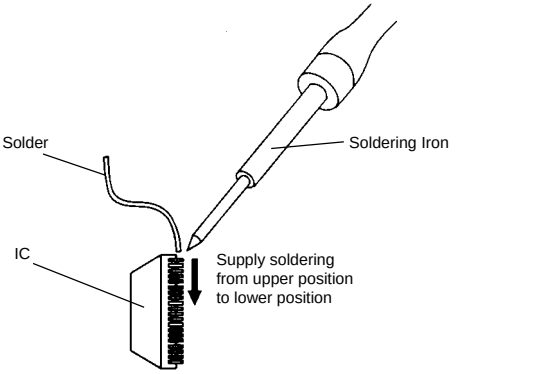


Fig. 2-6

3. Absorb the solder left on the lead using the Braided Shield Wire. **(Refer to Fig. 2-7.)**

   NOTE

   Do not absorb the solder to excess.

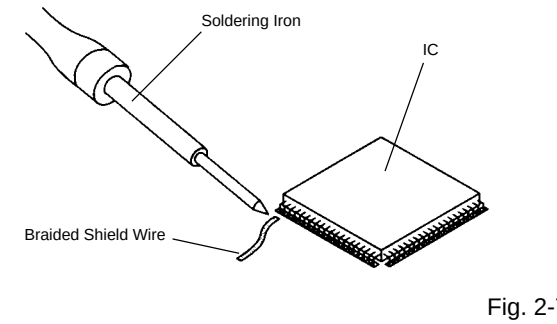


Fig. 2-7

4. When bridge-soldering between terminals and/or the soldering amount are not enough, resolder using a Thin-tip Soldering Iron. **(Refer to Fig. 2-8.)**

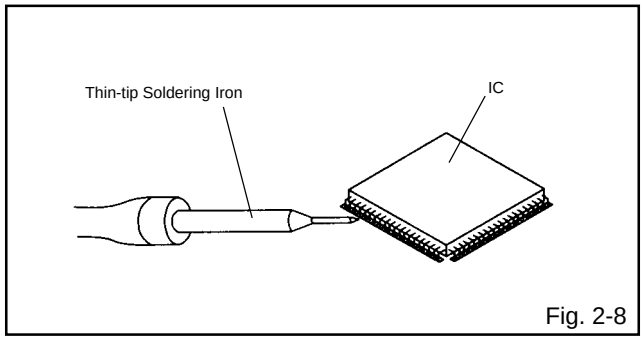


Fig. 2-8

5. Finally, confirm the soldering status on four sides of the IC using a magnifying glass.
   Confirm that no abnormality is found on the soldering position and installation position of the parts around the IC. If some abnormality is found, correct by resoldering.

   NOTE

   When the IC leads are bent during soldering and/or repairing, do not repair the bending of leads. If the bending of leads are repaired, the pattern may be damaged. So, be always sure to replace the IC in this case.

SERVICE MODE LIST

This unit provided with the following SERVICE MODES so you can repair, examine and adjust easily.
To enter the Service Mode, press both set key and remote control key for more than 2 seconds.

Set Key	Remocon Key	Operations
VOL. (-) MIN	0	Reset the user setting items (PICTURE, VOLUME and LANGUAGE) to the initial state for delivery.
VOL. (-) MIN	1	Initialization of the factory. NOTE: Do not use this for the normal servicing. If you set a factory initialization, the memories are reset such as the channel setting, and the POWER ON total hours.
VOL. (-) MIN	6	POWER ON total hours is displayed on the screen. Refer to the "CONFIRMATION OF HOURS USED". Can be checked of the INITIAL DATA of MEMORY IC. Refer to the "WHEN REPLACING EEPROM (MEMORY) IC".
VOL. (-) MIN	8	Writing of EEPROM initial data. NOTE: Do not use this for the normal servicing.
VOL. (-) MIN	9	Display of the Adjustment MENU on the screen. Refer to the "ELECTRICAL ADJUSTMENT" (On-Screen Display Adjustment).

CONFIRMATION OF HOURS USED

POWER ON total hours can be checked on the screen. Total hours are displayed in 16 system of notation.

NOTE: If you set a factory initialization, the total hours is reset to "0".

1. Set the VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button **(6)** on the remote control for more than 2 seconds.
3. After the confirmation of using hours, turn off the power.

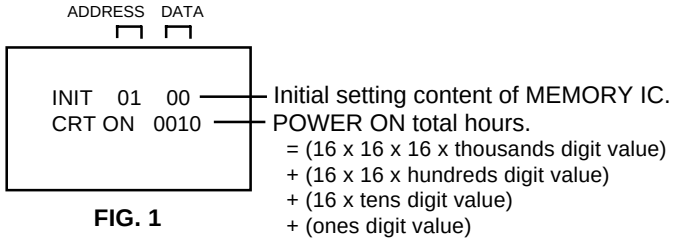

ADDRESS
DATA
INIT 01 00
CRT ON 0010
Initial setting content of MEMORY IC.
POWER ON total hours.
= (16 x 16 x 16 x thousands digit value)
+ (16 x 16 x hundreds digit value)
+ (16 x tens digit value)
+ (ones digit value)

FIG. 1

WHEN REPLACING EEPROM (MEMORY) IC

If a service repair is undertaken where it has been required to change the MEMORY IC, the following steps should be taken to ensure correct data settings while making reference to TABLE 1.

NOTE: No need setting for after INI 16 due to the adjustment value.

INI	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
00	---	00	00	00	00	21	86	40	68	40	27	07	83	00	06	73
10	10	00	80	80	80	BC	00	---	---	---	---	---	---	---	---	---

Table 1

1. Enter DATA SET mode by setting VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button **(6)** on the remote control for more than 2 seconds. ADDRESS and DATA should appear as FIG 1.
3. ADDRESS is now selected and should "blink". Using the VOL. +/- button on the remote, step through the ADDRESS until required ADDRESS to be changed is reached.
4. Press OK to select DATA. When DATA is selected, it will "blink".
5. Again, step through the DATA using VOL. +/- button until required DATA value has been selected.
6. Pressing OK will take you back to ADDRESS for further selection if necessary.
7. Repeat steps 3 to 6 until all data has been checked.
8. When satisfied correct DATA has been entered, turn POWER off (return to STANDBY MODE) to finish DATA input. **After the data input, set to the initializing of shipping.**
9. Turn POWER on.
10. Press both VOL. DOWN button on the set and Channel button **(1)** on the remote control for more than 2 seconds.
11. After the finishing of the initializing of shipping, the unit will turn off automatically.

The unit will now have the correct DATA for the new MEMORY IC.

ELECTRICAL ADJUSTMENTS

1. ADJUSTMENT PROCEDURE

Read and perform these adjustments when repairing the circuits or replacing electrical parts or PCB assemblies.

CAUTION

- Use an isolation transformer when performing any service on this chassis.
- Before removing the anode cap, discharge electricity because it contains high voltage.
- When removing a PCB or related component, after unfastening or changing a wire, be sure to put the wire back in its original position.
- When you exchange IC and Transistor for a heat sink, apply the silicon grease on the contact section of the heat sink. Before applying new silicon grease, remove all the old silicon grease. (Old grease may cause damages to the IC and Transistor).

Prepare the following measurement tools for electrical adjustments.

1. Oscilloscope
2. Digital Voltmeter
3. Pattern Generator

On-Screen Display Adjustment

1. In the condition of NO indication on the screen. Press the VOL. DOWN button on the set and the Channel button **(9)** on the remote control for more than 2 seconds to appear the adjustment mode on the screen as shown in **Fig. 1-1**.

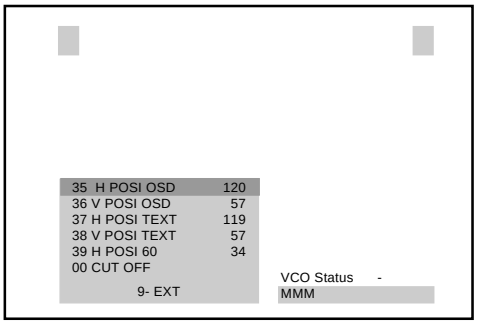


Fig. 1-1

2. Use the Channel button **(0-9)** or Channel UP/DOWN button on the remote control to select the options shown in **Fig. 1-2**.
3. Press the MENU button on the remote control to end the adjustments.

NO.	FUNCTION	NO.	FUNCTION
00	CUT OFF	20	TINT
01	RF AGC	21	SHARP
02	AGC GAIN	22	CONTRAST CENT
03	R DRIVE	23	CONTRAST MAX
04	R CUTOFF	24	CONTRAST MIN
05	G DRIVE	25	COLOR CENT
06	G CUTOFF	26	COLOR MAX
07	B DRIVE	27	COLOR MIN
08	H POSI (50)	28	M R CUT OFF
09	V POSI (50)	29	M G CUT OFF
10	V POSI (60)	30	M B CUT OFF
11	V SIZE (50)	31	CVBS OUT
12	V SIZE (60)	32	APR THRESHOLD
13	VCO COARSE	33	BELL FILTER
14	VCO FINE	34	BANDPASS
15	VCO COARSE L1	35	H POSI OSD
16	VCO FINE L1	36	V POSI OSD
17	BRIGHT CENT	37	H POSI TEXT
18	BRIGHT MAX	38	V POSI TEXT
19	BRIGHT MIN	39	H POSI (60)

Fig. 1-2

2. BASIC ADJUSTMENTS

2-1: CONSTANT VOLTAGE

1. Place the set with Aging Test for more than 5 minutes.
2. Connect the digital voltmeter to **TP501**.
3. Set condition is AV MODE without signal.
4. Adjust the **VR501** until the DC voltage is 117 ± 0.5V.

2-2: VCO

1. Place the set with Aging Test for more than 10 minutes.
2. Connect the oscillator (39.5MHz) to **TP001**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(13)** on the remote control to select "VCO COARSE".
4. Press the VOL. +/- button on the remote control until the "OK" appear on the screen. If the "OK" is not displayed, select the "+" side on the changed from "+" to "-".
5. Press the Page UP button once to set to "VCO FINE" mode.
6. Press the VOL. +/- button on the remote control to select the 5 step down point from the upper limit on the "OK".
   (Example: In case of the "OK" range 30~41, select 36.)

2-3: AGC VOLTAGE

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the UHF (63 ± 1dB).
3. Connect the digital voltmeter to **pin 5 of CP101**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(01)** on the remote control to select "RF AGC".
5. Press the VOL. +/- button on the remote control until the digital voltmeter is 2.4 ± 0.05V.

2-4: CUT OFF

1. Set condition is AV MODE without signal.
2. Using the remote control, set the brightness and contrast to normal position.
3. Place the set with Aging Test for more than 15 minutes.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(00)** on the remote control to select "CUT OFF".
5. Adjust the **Screen Volume** until a dim raster is obtained.

2-5: WHITE BALANCE

NOTE: Adjust after performing CUT OFF adjustment.

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the gray scale pattern from the Pattern Generator.
3. Using the remote control, set the brightness and contrast to normal position.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(03)** on the remote control to select "R DRIVE".
5. Press the Page UP/DOWN button on the remote control to select the "R DRIVE", "G DRIVE", "M R CUTOFF" or "M G CUTOFF".
6. Adjust the VOL. +/- button on the remote control to whiten the R DRIVE, G DRIVE, M R CUT OFF, and M G CUT OFF at each step tone sections equally.
7. Perform the above adjustments 5 and 6 until the white color is looked like a white.

ELECTRICAL ADJUSTMENTS

2-6: FOCUS

1. Receive a 70dB monoscope pattern.
2. Turn the Focus Volume fully counterclockwise once.
3. Adjust the **Focus Volume** until picture is distinct.

2-7: HORIZONTAL POSITION

1. Receive the monoscope pattern from the Pattern Generator.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(08)** on the remote control to select "H POSI (50)".
4. Press the VOL. +/- button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.
5. Receive the monoscope pattern of NTSC. (Audio Video Input)
6. Using the remote control, set the brightness and contrast to normal position.
7. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(39)** on the remote control to select "H POSI (60)".
8. Press the VOL. +/- button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.

2-8: VERTICAL SIZE

1. Receive the monoscope pattern from the Pattern Generator.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(11)** on the remote control to select "V SIZE (50)".
4. Adjust by using the VOL. +/- button on the remote control so that the Up/Down OVER SCAN Quantity becomes equal to the Right/Left OVER SCAN Quantity.
5. Receive a broadcast and check if the picture is normal.
6. Receive the monoscope pattern of NTSC. (Audio Video Input)
7. Using the remote control, set the brightness and contrast to normal position.
8. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(12)** on the remote control to select "V SIZE (60)".
9. Adjust by using the VOL. +/- button on the remote control so that the Up/Down OVER SCAN Quantity becomes equal to the Right/Left OVER SCAN Quantity.

2-9: VERTICAL POSITION/VERTICAL LINEARITY

1. Receive the monoscope pattern from the Pattern Generator.
2. Using the remote control, set the brightness and contrast to normal position.
3. Adjust the **VR401** until the horizontal line becomes fit to the notch of the shadow mask.
4. Adjust the **VR420** until the SHIFT quantity of the OVER SCAN on upside and downside becomes minimum.

2-10: BRIGHT CENT

1. Receive the PAL black pattern*. (RF Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Place the set with Aging Test for more than 15 minutes.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(17)** on the remote control to select "BRIGHT CENT".
5. Press the VOL. +/- button on the remote control until the screen begin to shine.
6 Receive the PAL black pattern*. (Audio Video Input)
7. Set to the AV mode. Then perform the above adjustments 2~5.

*The Black Pattern means the whole black raster signal. Select the "RASTER" of the pattern generator, set to the OFF position for each R, G and B.

2-11: CONTRAST CENT

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(22)** on the remote control to select "CONTRAST CENT".
2. Press the VOL. +/- button on the remote control until the contrast step No. becomes "31".
3. Receive a broadcast and check if the picture is normal.
4. Set to the AV mode.
5. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(22)** on the remote control to select "CONTRAST CENT".
6. Press the VOL. +/- button on the remote control until the contrast step No. becomes "34".
7. Receive a broadcast and check if the picture is normal.

2-12: COLOR CENT

1. Receive the PAL color bar pattern. (RF Input)
2. Using the remote control, set the brightness, contrast and color to normal position.
3. Connect the oscilloscope to **TP022**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(25)** on the remote control to select "COLOR CENT".
5. Adjust the VOLTS RANGE VARIABLE knob of the oscilloscope until the range between white 100% and 0% is set to 5 scales on the screen of the oscilloscope.
6. Press the VOL. +/- button on the remote control until the red color level is adjusted to 85 ± 10% of the white level. **(Refer to Fig. 2-1)**
7. Receive the PAL color bar pattern. (Audio Video Input)
8. Set to the AV mode. Then perform the above adjustments 2~6.

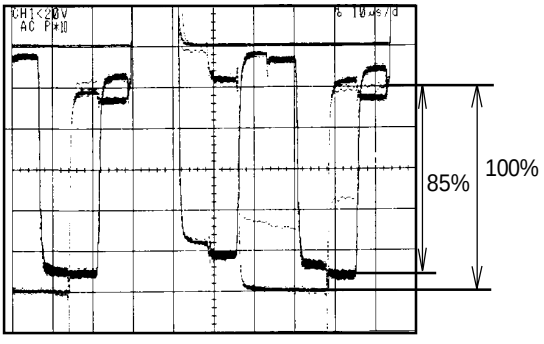


Fig. 2-1

ELECTRICAL ADJUSTMENTS

2-13: TINT

1. Receive the NTSC color bar pattern. (Audio Video Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Connect the oscilloscope to **TP024**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(20)** on the remote control to select "TINT".
5. Press the VOL. +/- button on the remote control until the section "A" becomes a straight line. **(Refer to Fig. 2-2)**

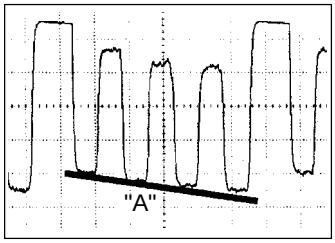


Fig. 2-2

2-14: Confirmation of Fixed Value (Step No.)

Please check if the fixed values of the each adjustment items are set correctly referring below.

NO.	FUNCTION	RF	AV
02	AGC GAIN	00	---
04	R CUTOFF	00	---
06	G CUTOFF	00	---
07	B DRIVE	45	---
09	V POSI (50)	08	---
10	V POSI (60)	08	---
18	BRIGHT MAX	25	25
19	BRIGHT MIN	12	12
20	TINT	32	ADJ.
21	SHARP	02	02
23	CONTRAST MAX	50	50
24	CONTRAST MIN	10	10
26	COLOR MAX	50	50
27	COLOR MIN	10	10
30	M B CUT OFF	127	---
31	CVBS OUT	31	---
32	APR THRESHOLD	00	---
33	BELL FILTER	00	---
34	BANDPASS	00	---
35	H POSI OSD	125	---
36	V POSI OSD	50	---
37	H POSI TEXT	122	---
38	V POSI TEXT	58	---

*To check for the fixed values of the RF (60Hz), indicate the adjustment mode screen while input the 60Hz video signal.

ELECTRICAL ADJUSTMENTS

3. PURITY AND CONVERGENCE ADJUSTMENTS

NOTE

1. Turn the unit on and let it warm up for at least 30 minutes before performing the following adjustments.
2. Place the CRT surface facing east or west to reduce the terrestrial magnetism.
3. Turn ON the unit and demagnetize with a Degauss Coil.

3-1: STATIC CONVERGENCE (ROUGH ADJUSTMENT)

1. Tighten the screw for the magnet. Refer to the adjusted CRT for the position. **(Refer to Fig. 3-1)**
   If the deflection yoke and magnet are in one body, untighten the screw for the body.
2. Receive the green raster pattern from the color bar generator.
3. Slide the deflection yoke until it touches the funnel side of the CRT.
4. Adjust center of screen to green, with red and blue on the sides, using the pair of purity magnets.
5. Switch the color bar generator from the green raster pattern to the crosshatch pattern.
6. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
7. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.
8. Adjust the crosshatch pattern to change to white by repeating steps 6 and 7.

3-2: PURITY

NOTE

Adjust after performing adjustments in section 3-1.

1. Receive the green raster pattern from color bar generator.
2. Adjust the pair of purity magnets to center the color on the screen.
   Adjust the pair of purity magnets so the color at the ends are equally wide.
3. Move the deflection yoke backward (to neck side) slowly, and stop it at the position when the whole screen is green.
4. Confirm red and blue colors.
5. Adjust the slant of the deflection yoke while watching the screen, then tighten the fixing screw.

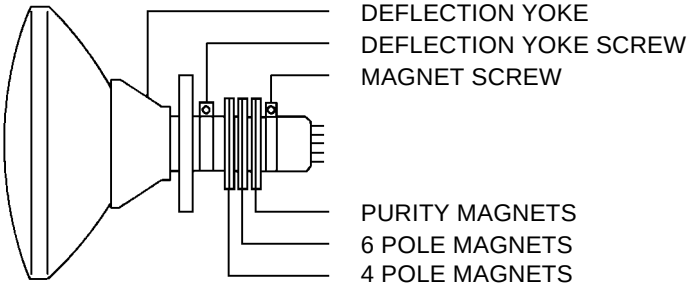


Fig. 3-1

3-3: STATIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-2.

1. Receive the crosshatch pattern from the color bar generator.
2. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
3. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.

3-4: DYNAMIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-3.

1. Adjust the differences around the screen by moving the deflection yoke upward/downward and right/left. **(Refer to Fig. 3-2-a)**
2. Insert three wedges between the deflection yoke and CRT funnel to fix the deflection yoke. **(Refer to Fig. 3-2-b)**

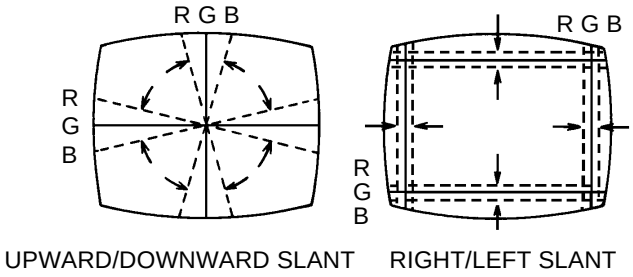


Fig. 3-2-a

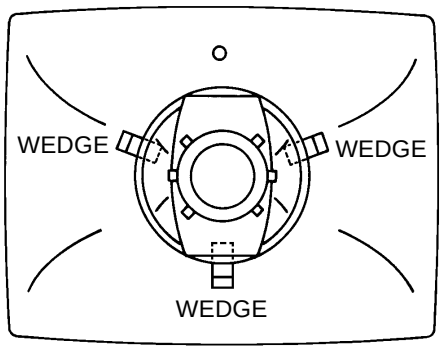
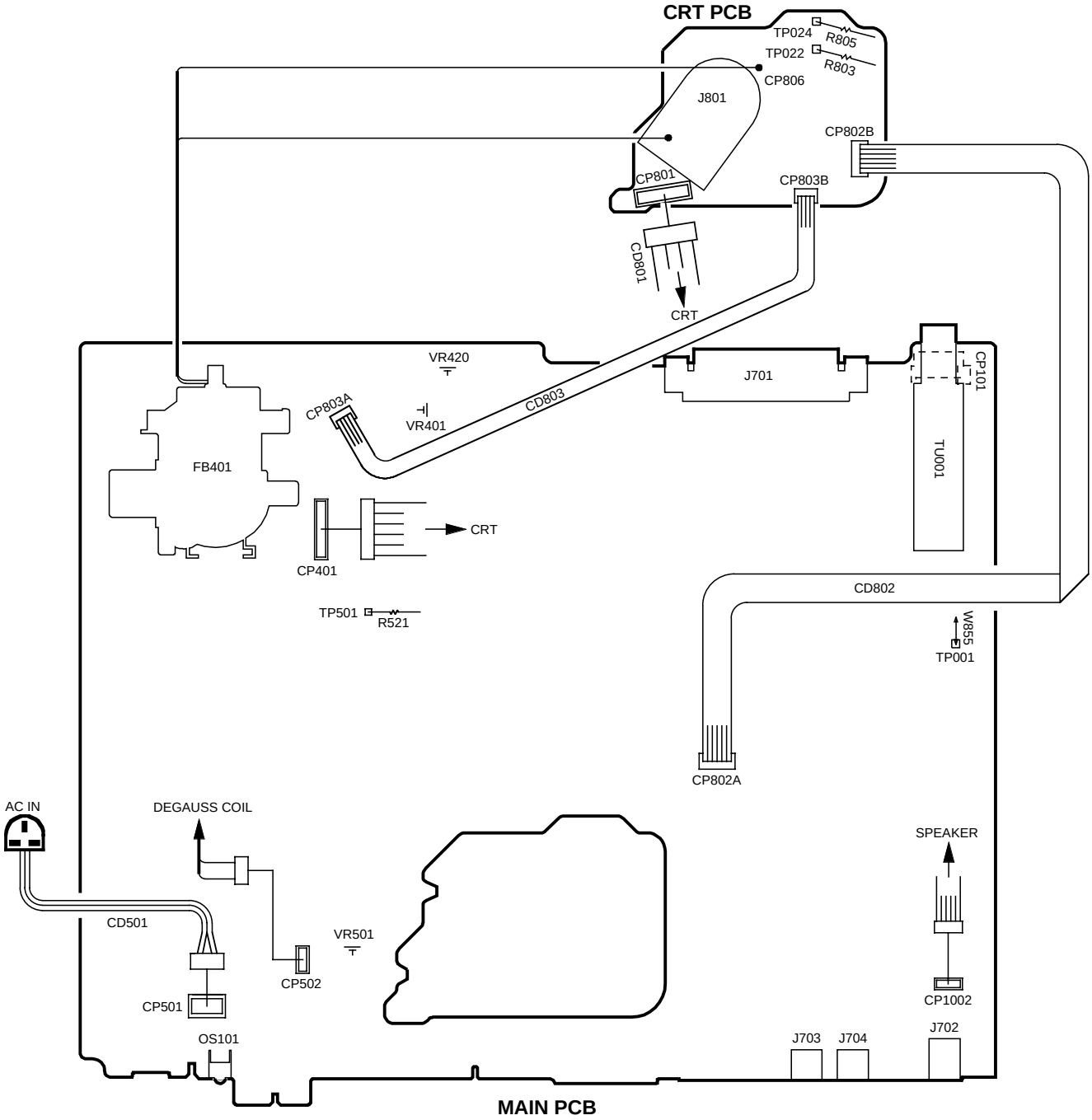


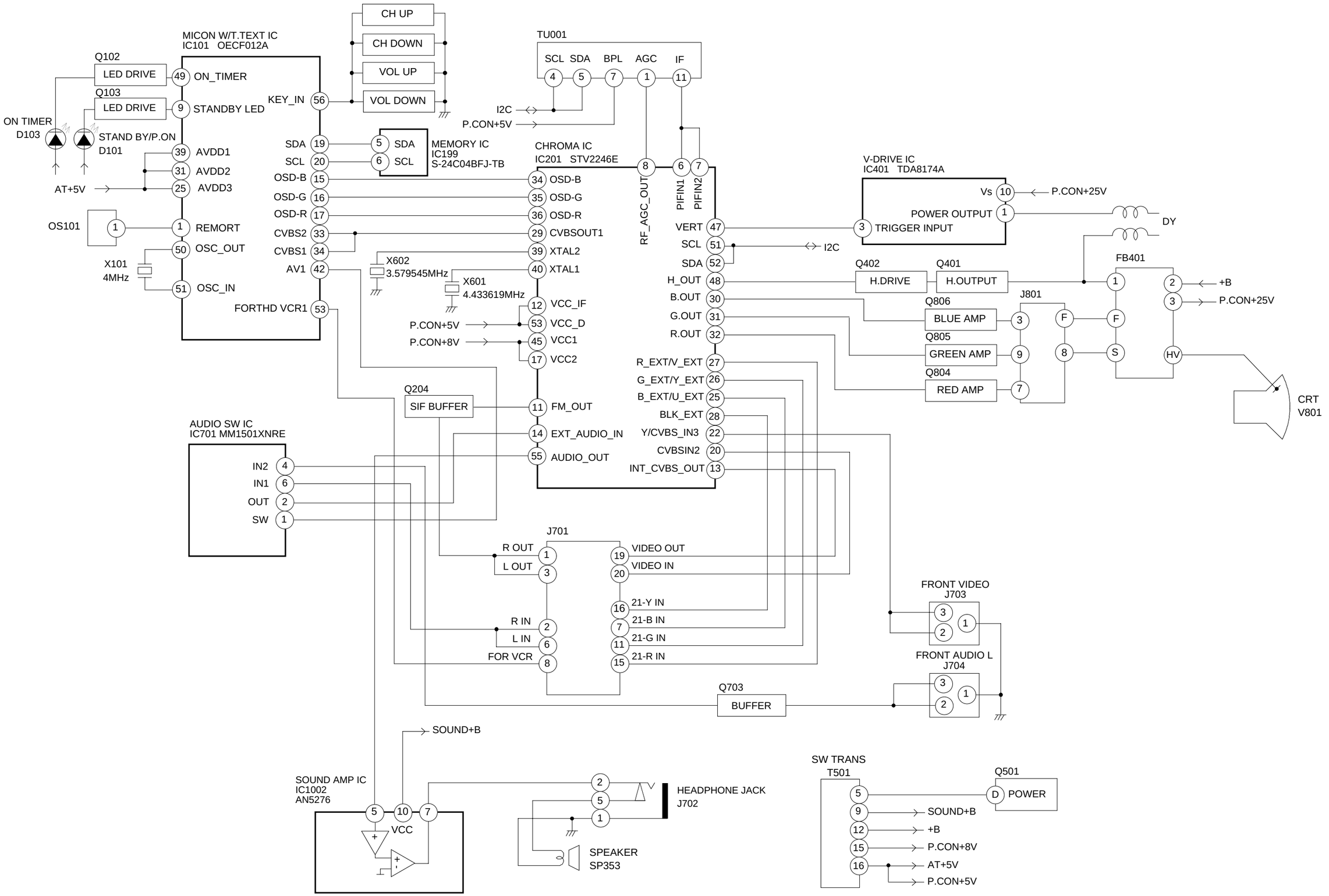
Fig. 3-2-b

ELECTRICAL ADJUSTMENTS

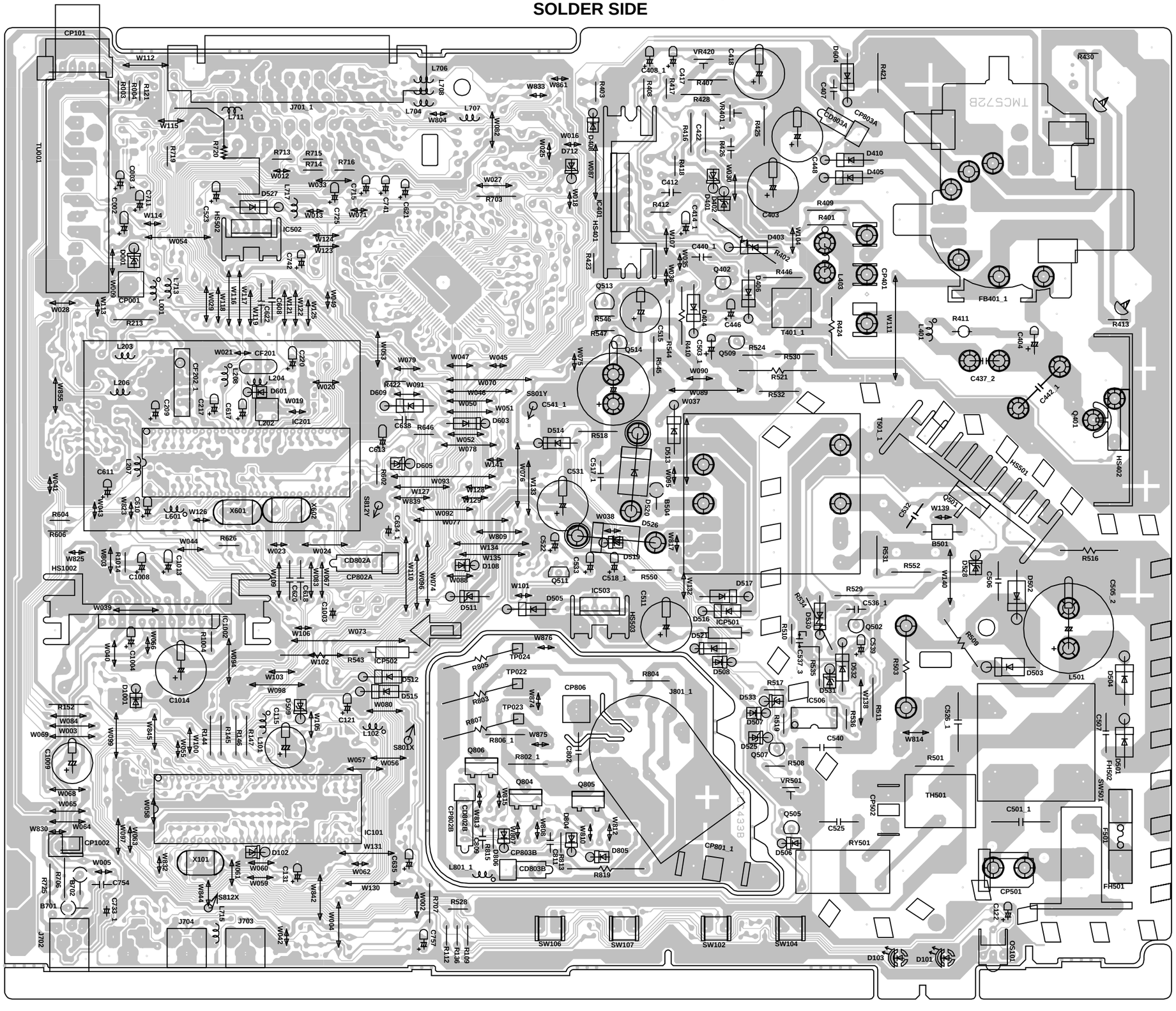
4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)



BLOCK DIAGRAM



PRINTED CIRCUIT BOARDS
MAIN/CRT (INSERTED PARTS)
SOLDER SIDE


CP101
TU001
W112
L706
L708
L704
L707
W804
W833
W861
J701_1
L711
W115
R003
R004
R121
R719
R720
R713
R715
R714
R716
W012
W033
W082
W025
W016
D712
W027
R703
W018
W087
D408
R403
C401
HS401
R423
C408_1
VR420
C418
R417
R407
R428
R408
C417
D604
C407
R421
R430
VR401_1
R425
R426
R416
C422
R418
C412
D402
D401
C414_1
C403
CD803A
CP803A
C448
D410
D405
R409
R401
W104
W107
W035
W036
C440_1
D403
R402
R446
Q402
D406
Q513
R546
R547
Q514
C515
R544
R545
D404
C446
R410
C503_1
Q509
R524
R530
R521
R532
W090
W089
W037
T401_1
R424
L403
CP401
W111
L401
R411
C404
C437_2
C442_1
Q401
R413
FB401_1
TMC572B
T501_1
HS501
HS402
Q501
C532
W139
B501
R831
R552
W140
R516
C506
D502
D528
C505_2
L501
D503
D504
C507
D501
FH502
SW501
F501
FH501
CP501
C422_1
GS101
D103
D101
R529
C536_1
Q502
R524
R530
C537_3
R535
D532
D531
R510
R509
R503
C539
W138
R511
W814
C526_1
C540
R501
TH501
C501_1
CP502
C525
RY501
Q505
D506
R508
VR501
R517
D533
IC506
D507
R519
D525
Q507
R536
D508
D521
D516
ICP501
D517
IC503
HS503
C511
W132
W101
D505
R550
C518_1
Q511
C533
C522
W038
D519
D526
W817
D520
B504
W095
C531
C517_1
S801Y
C541_1
D514
R518
D513
W076
W133
W809
W134
W135
D108
W088
D511
W077
W092
W839
W127
W128
W129
W141
D605
R602
C613
C634_1
S812Y
X601
X602
L601
W126
R604
R606
W044
R626
W023
W024
CD802A
CP802A
W825
HS1002
W813
RJ014
C1008
C1013
W109
C620
C618
W083
W087
C1003
W110
W096
W074
W039
W040
W866
C1004
RJ004
IC1002
W094
W106
W102
R543
ICP502
W073
W876
TP024
R805
TP022
R803
TP023
R807
R806_1
W875
W874
CP806
R804
J801_1
C802
R802_1
Q806
Q804
Q805
CP802B
CD802B
W813
W815
W814
W808
D804
W810
W812
D805
CP803B
CD803B
R813
R819
L801_1
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W103
W098
D512
D515
W080
C121
L102
S801X
W057
W056
D509
C615
W105
L101
C1014
D1001
R152
W084
W003
W069
C1009
W099
W845
W055
R144
W100
R145
R146
R147
W068
W065
W830
W064
CP1002
W058
W097
W083
IC101
W131
W062
W130
C635
W060
W061
W059
D102
C131
X101
W832
W824
S812X
L715
J704
J703
J702
W042
W004
W002
R707
C757
R528
R112
R136
R109
SW106
SW107
SW102
SW104
W005
C754
R706
R725
B701
B702
C733_1
W814
W813
W815
W808
W810
W812
W811
W807
W804
W805
W806
W809
W801
W802
W803
W804
W805
W806
W807
W808
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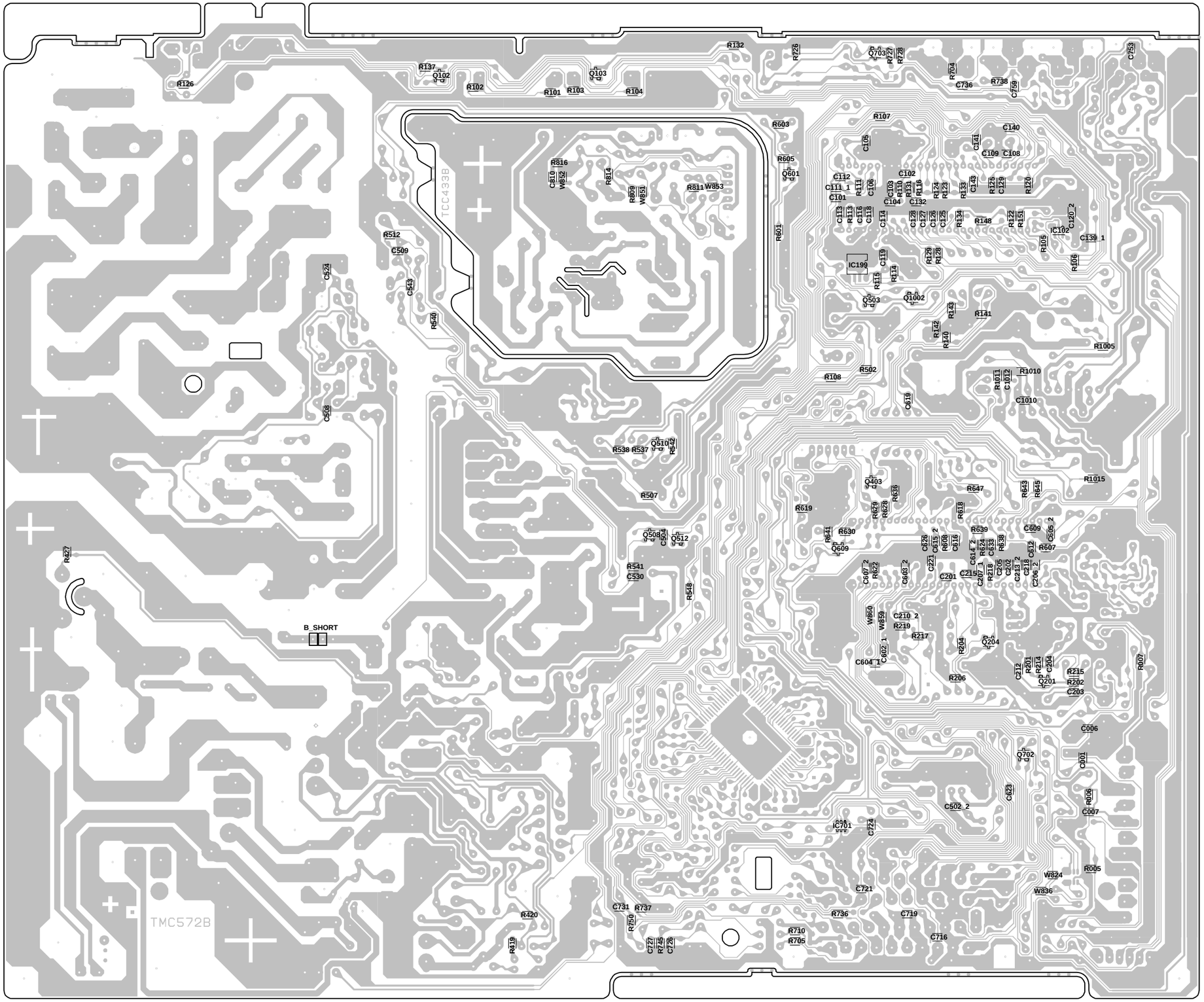
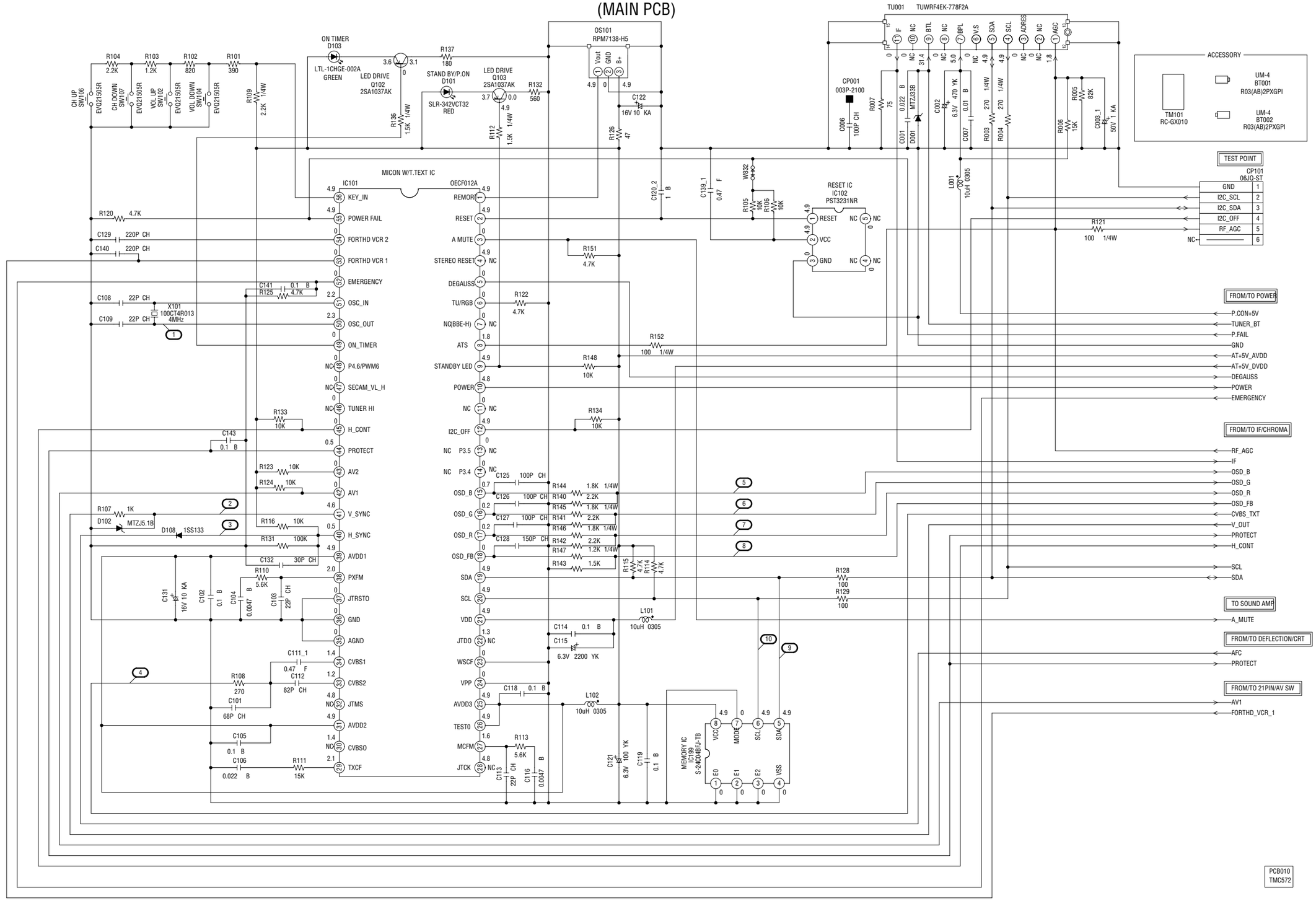
W810
W811
W812
W813
W814
W815
W816
W817
W818
W819
W820
W821
W822
W823
W824
W825
W826
W827
W828
W829
W830
W831
W832
W833
W834
W835
W836
W837
W838
W839
W840

PRINTED CIRCUIT BOARDS
MAIN/CRT (CHIP MOUNTED PARTS)
SOLDER SIDE



MICON/TUNER SCHEMATIC DIAGRAM

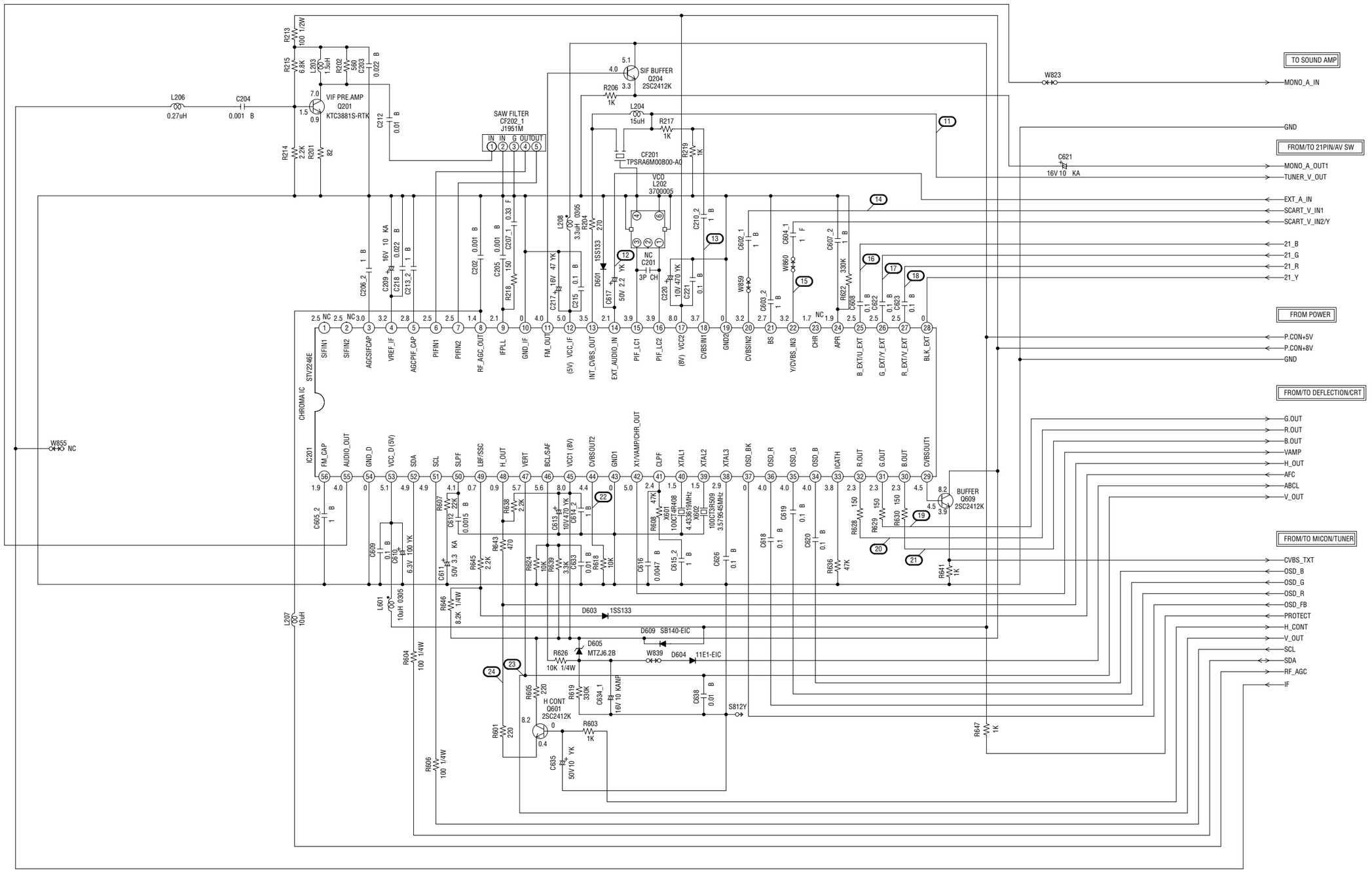
(MAIN PCB)



NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

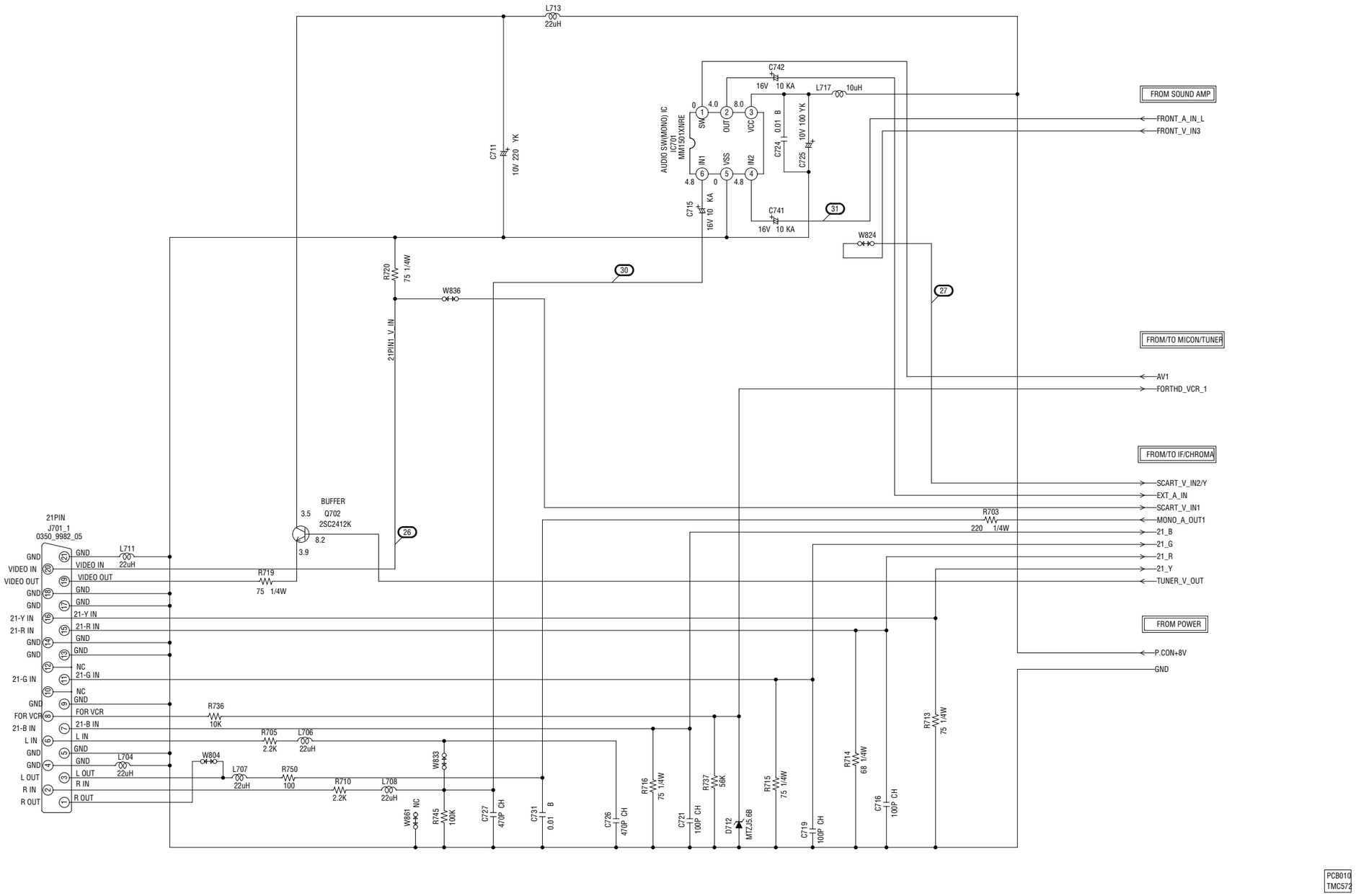
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

IF/CHROMA SCHEMATIC DIAGRAM
(MAIN PCB)



21PIN/AV SW SCHEMATIC DIAGRAM

(MAIN PCB)

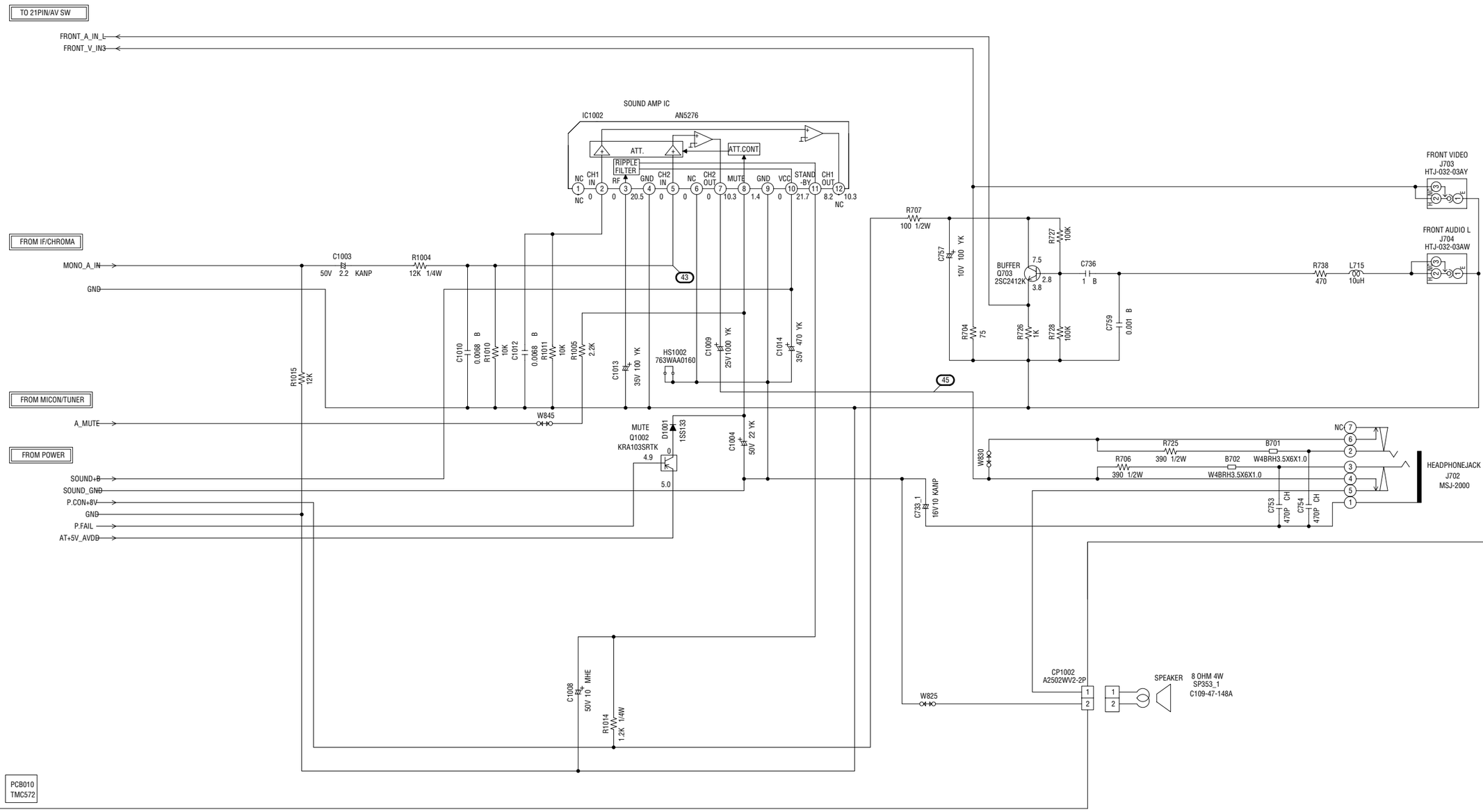


NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

NOTE:THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

SOUND AMP SCHEMATIC DIAGRAM

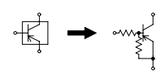
(MAIN PCB)



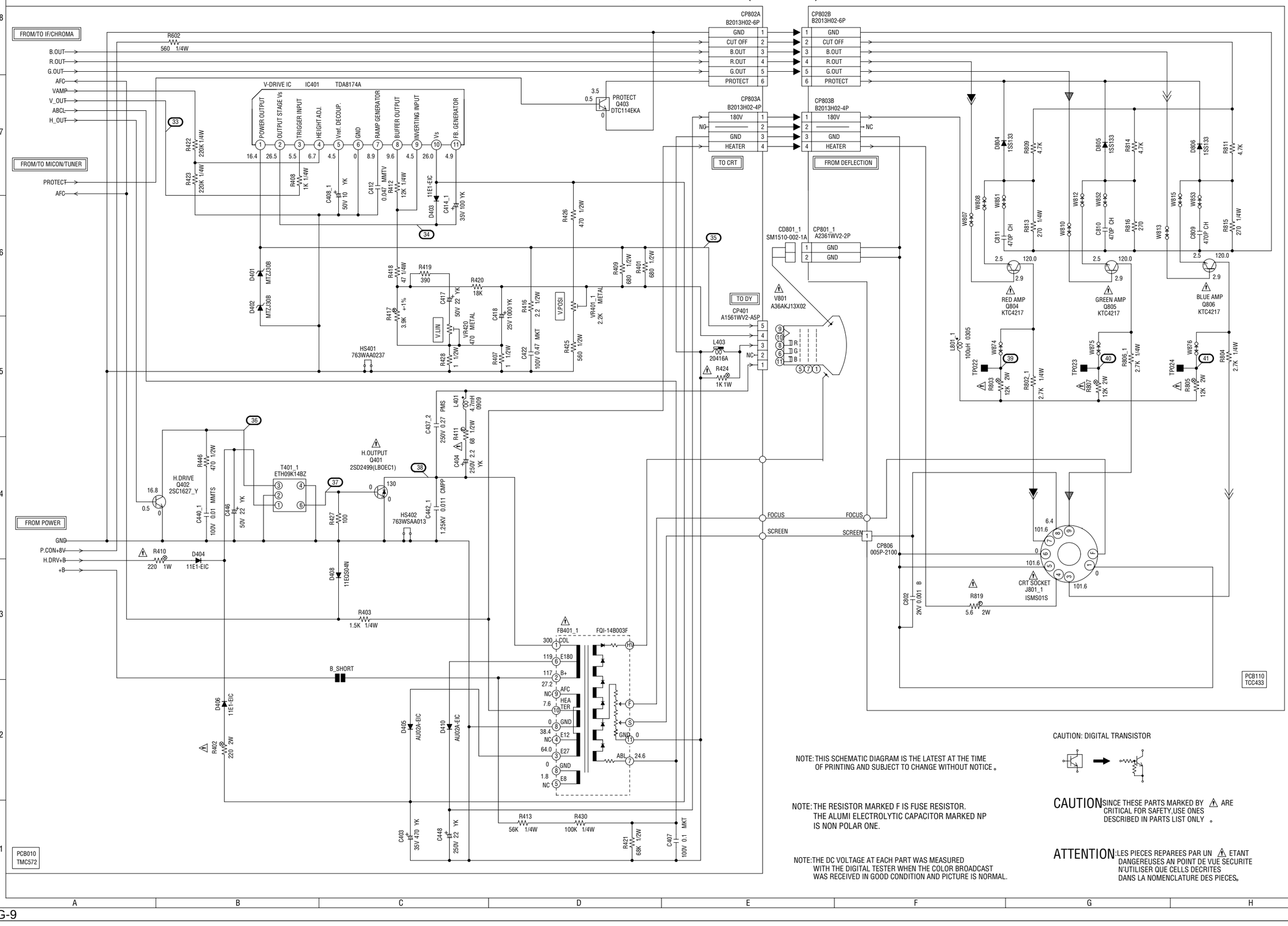
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

NOTE:THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

CAUTION: DIGITAL TRANSISTOR



DEFLECTION/CRT SCHEMATIC DIAGRAM (MAIN PCB)



NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

CAUTION: DIGITAL TRANSISTOR

CAUTION SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

POWER SCHEMATIC DIAGRAM

(MAIN PCB)

3A 125V

D526 FE201-6L49 | ICP502 20P_3000 | R543 0.39 3W | C531 35V 1000 MHE

D520 30DF6-FC | C517_1 2KV 0.0012 RR | R521 0.82 3W | R524 47K 1/4W | C503_1 100V 10 YK | R530 5.6K 1/4W

EMERGENCY Q509 2SA1624 | R544 6.8K 1/2W | R545 6.8K 1/2W | R532 22K 1/4W

B504 W48RH3.5X6X1.0 | C541_1 160V 100 YXF | S801X | W817

P.CON SW Q513 2SA1371 | R546 10K 1/4W | R547 10K 1/4W | P.CON SW Q514 2SC2909 | R548 10K

IC502 9V REG.IC KIA78R09API (IN OUT GND SW)

D506 1SS133 | R528 10K 1/4W | RELAY SW Q505 KTC3203_Y | RY501 ALKS321

C525 250V 0.001 KX | W814 | TH501 B59209-J80-A10

R503 3.9 7W | D503 RM11C-EIC | R509 0.22 1W | D502 RM11C-EIC | C506 2KV 0.001 B | C507 2KV 0.001 B | D501 RM11C-EIC | D504 RM11C-EIC | C505_2 400V 82 USR | R531 1.5M 1/2W | R552 1.5M 1/2W | D528 MTZJ18B

R501 1.5M 1/2W | C526_1 275V 0.22 ECQUL | COIL,LINE FILTER L501 0R8A393F28Y | C501_1 275V 0.22 ECQUL

F501 T4A_L_250V T4A_L_250V | FH502 EYF-528C | FH501 EYF-528C | 4A 250V

MAIN POWER SW SW501 ESB92S22B

CP501 A3963WV2-3PD | CP502 A1561WV2-2P | BLUE | BROWN

AC230V-240V_50Hz CD501_1 06635826

L502 W5T29X7.5X19

DEGAUSS COIL L503 8R140027

T501_1 81350864 (272 304 304 342 14.5 0 108.2 0 0 11.2 8.4 | 17.3 8.5 NC 0)

B501 W5RH3.5X6X1.0 | C532 2KV 0.0027 R | D 343.6 | G 4.8 | S 0.6 | POWER Q501 2SK2651-01MR

C536_1 0.047 MMTV | R534 330 1W | D530 1SS133 | R510 220 1/4W | R535 2.2K 1/4W | D532 1N4937 | D531 MTZJ15B | R536 2.2K 1/4W

FEED BACK IC506 LTV-817M-VB (14.8 6.7 0.4 5.6)

R529 680 1/4W | R516 1.2 1W | POWER Q502 KTC3203_Y | C508 0.01 B | C537_3 0.47 MMT | C524 0.01 B | C539 50V 10 YK | R511 2.2K 1/4W | HSS501 763WAA0178 | C540 250V 0.0022 KX

D516 SB290S | 7A 125V | ICP501 20P 7000 | D513 SB290S | C515 16V 1000 YK | D517 1N4937 | R550 100 1/2W | C511 16V 2200 YK | C518_1 50V 4.7 YK

FEED BACK SWITCHING Q507 KTC3198 | C543 0.001 B | R512 10K | R517 1.5K 1/4W | R540 100 | D525 MTZJ6.8B | R508 5.6K +-1% | VR501 2.2K | S801Y

R518 120K 1/4W | D521 1SS133 | D519 1SS133 | D514 1SS133 | D507 1SS133 | D533 MTZJ5.6B | D508 1SS133

HS502 763WAA0187 | C523 10V 220 YK | C502_2 1 B | D527 11E1-EIC

R507 2.2K | D511 MTZJ12B | P.FAIL Q503 2SA1037AK | R502 10K | D509 MTZJ5.1B

6V REG. IC IC503 KIA278R06PI (IN OUT GND SW)

D512 SB140-EIC | D515 SB140-EIC | W809

P.CON SW Q511 KTA1281_Y | D505 11E1-EIC | R538 10K | P.CON SW Q510 DTC124EKA | R537 560 | R542 1K | C533 6.3V 220 YK | C522 16V 10 KA | HSS503 763WAA0187

EMERGENCY Q508 DTC114TKA | C530 0.1 B | R541 27K | EMERGENCY Q512 DTA114EKA | C504 0.001 B

PCB010 TMC572

TO DEFLECTION/CRT
- H.DRV+B
- +B
- P.CON+8V
- GND

TO SOUND AMP
- SOUND+B
- SOUND_GND
- P.CON+8V
- AT+5V_AVDD
- P.FAIL
- GND

TO 21PIN/AV SW
- GND
- P.CON+8V

TO IF/CHROMA
- GND
- P.CON+8V
- P.CON+5V

FROM/TO MICON/TUNER
- P.FAIL
- TUNER_BT
- DEGAUSS
- POWER
- AT+5V_AVDD
- AT+5V_DVDD
- P.CON+5V
- EMERGENCY
- GND

7A 125V | 3A 125V | 4A 250V

CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE 4A 250V(F501)AND 7A 125V(ICP501) 3A 125V(ICP502).

ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQUES D'INCEIE N'UTILISER QUE DES FUSIBLE DE MEME TYPE 4A 250V(F501) ET 7A 125(ICP501) AND 3A 125V(IC502).

CAUTION: ICP501 IS MANUFACTURED BY SKYGATE CO,LTD. TYPE 20N.

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

CAUTION: DIGITAL TRANSISTOR

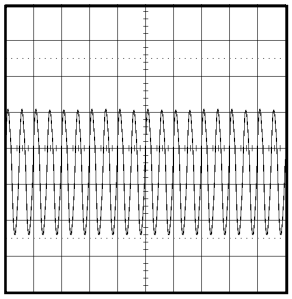
CAUTION: DIGITAL TRANSISTOR

WAVEFORMS

MICON/TUNER

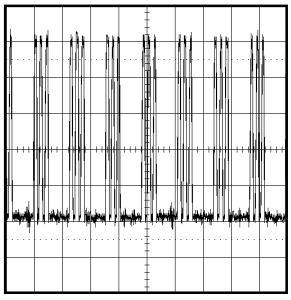
0.5µs
1V

1



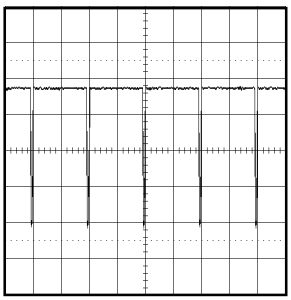
50µs
100mV

6



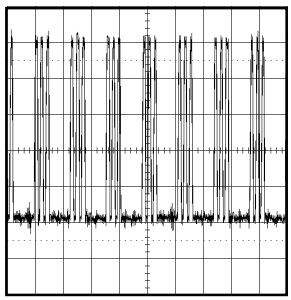
10ms
1V

2



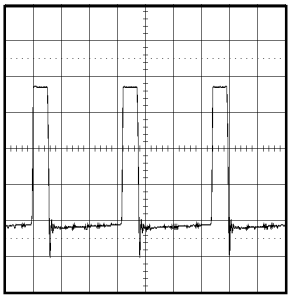
50µs
100mV

7



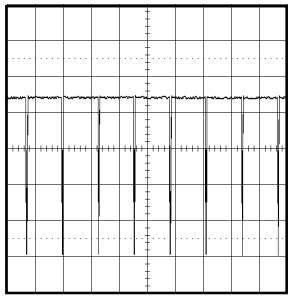
20µs
1V

3



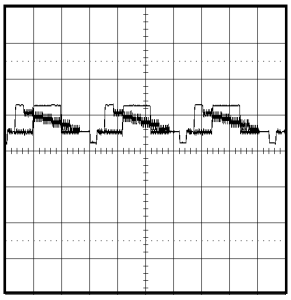
50µs
0.5V

8



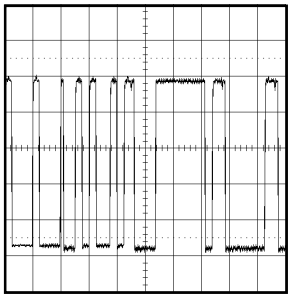
20µs
1V

4



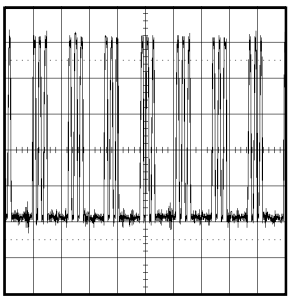
0.2ms
1V

9



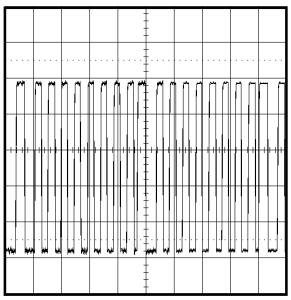
50µs
100mV

5



0.2ms
1V

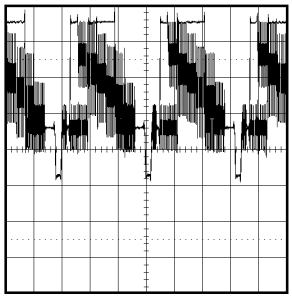
10



IF/CHROMA

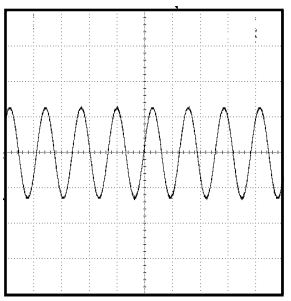
20µs
0.5V

11



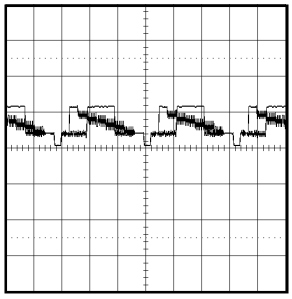
2ms
200mV

12



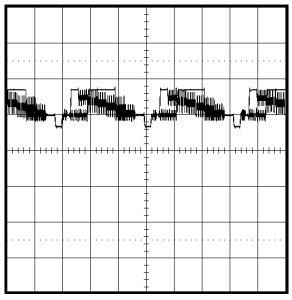
20µs
1V

13



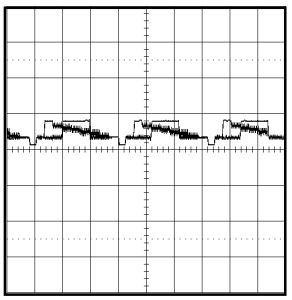
20µs
1V

14



20µs
1V

15

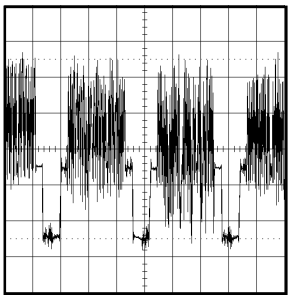


NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

WAVEFORMS

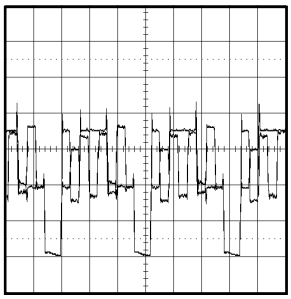
20µs
100mV

⑯



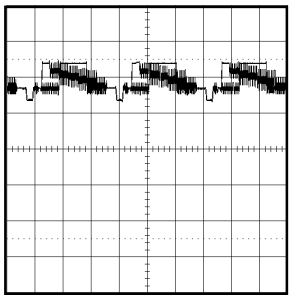
20µs
1V

㉑



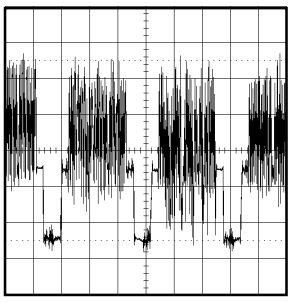
20µs
1V

㉗



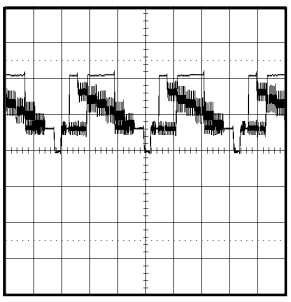
20µs
1V

⑰



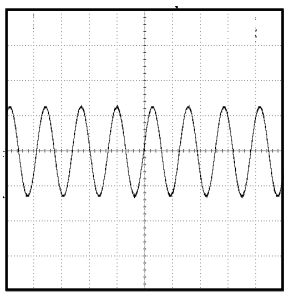
20µs
1V

㉒



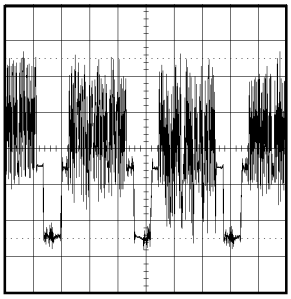
2ms
200mV

㉚



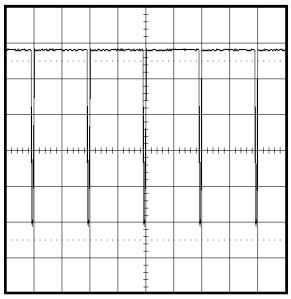
20µs
100mV

⑱



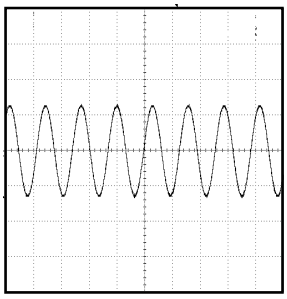
10ms
1V

㉓



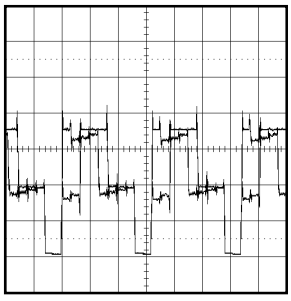
2ms
200mV

㉛



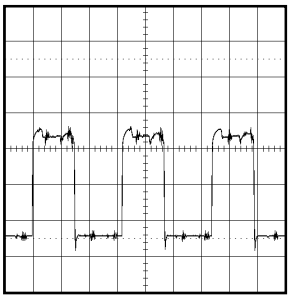
20µs
1V

⑲



20µs
200mV

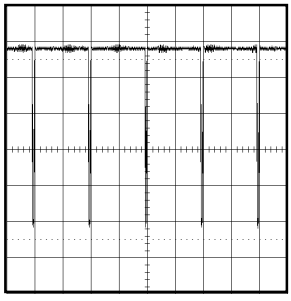
㉔



DEFLECTION/CRT

10ms
1V

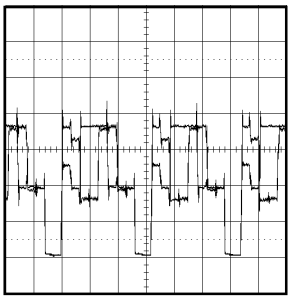
㉝



21PIN/AV SW

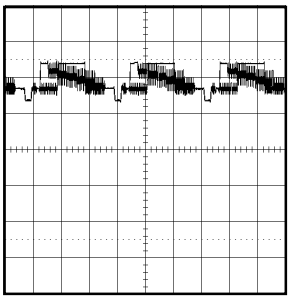
20µs
1V

⑳



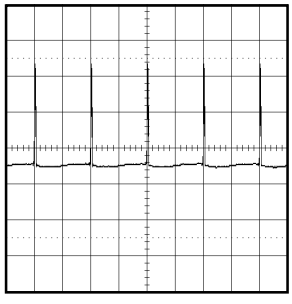
20µs
1V

㉖



10ms
10V

㉞

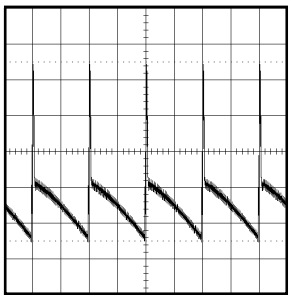


NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

WAVEFORMS

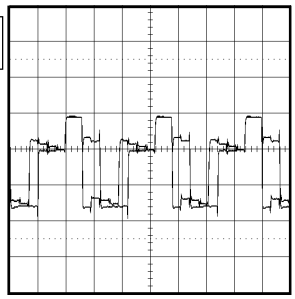
10ms
10V

35



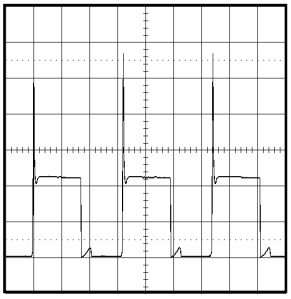
20µs
50V

40



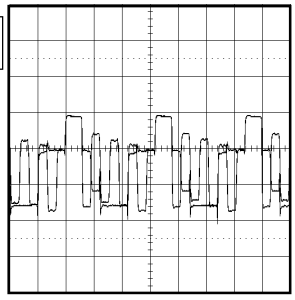
20µs
10V

36



20µs
50V

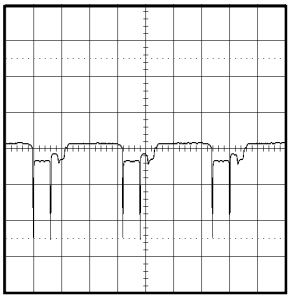
41



SOUND AMP

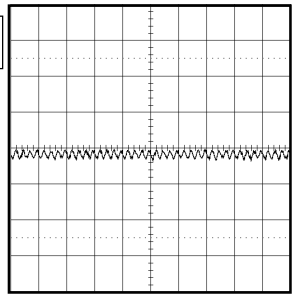
20µs
5V

37



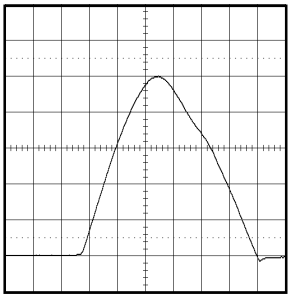
2ms
0.5V

43



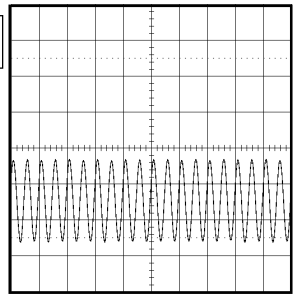
2µs
200V

38



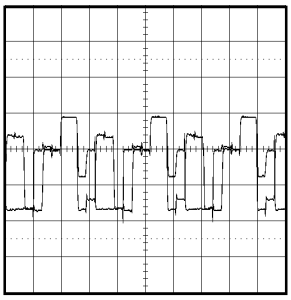
0.2ms
5V

45



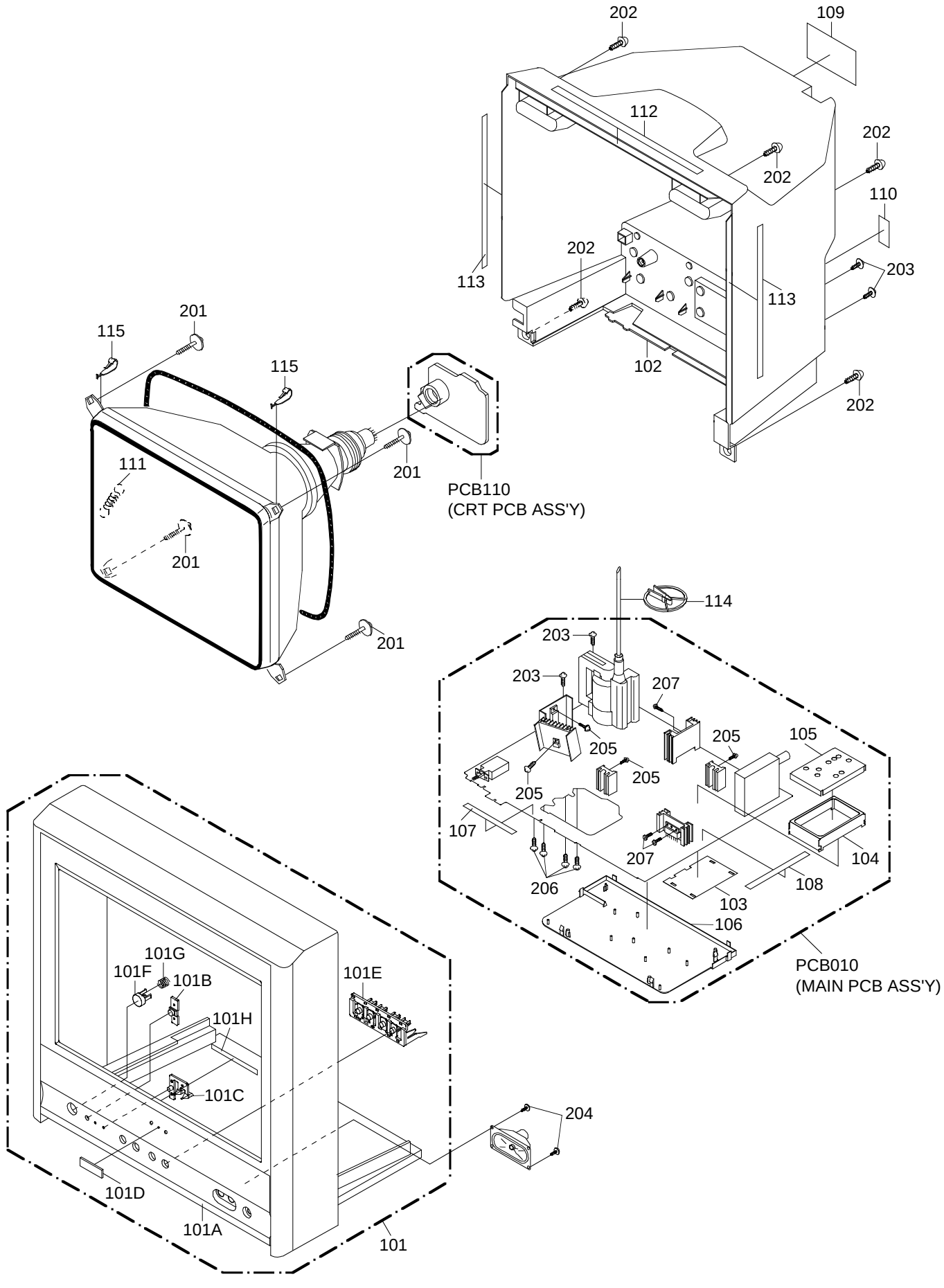
20µs
50V

39



NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

MECHANICAL EXPLODED VIEW



MECHANICAL REPLACEMENT PARTS LIST

Location	Part Number	Description	
101	A3N704C720	CABINET,FRONT ASSY	
101A	701WPJC306	CABINET,FRONT	
101B	711WPAA098	PLATE,FRONT	
101C	713WPAA116	GLASS,LED	
101D	723549A016	BADGE,BRAND	
101E	735WPBA782	BUTTON,FRAME	
101F	735WPBA783	BUTTON,POWER	
101G	743WKA0047	SPRING,BUTTON	
101H	800WQ00045	FELT SHEET	
102	A3N704C740	CABINET,BACK ASSY	
103	752WSAA006	PLATE,SHIELD	
104	752WSAA008	SHIELD,CASE	
105	752WSAA013	SHIELD,LID	
106	755WPAA016	COVER,PCB	
107	800WQ0A022	FELT SHEET	
108	800WQ0A023	FELT SHEET	
109	722549A209	SHEET,RATING	
110	723000C215	SHEET,JACK	
111	741WUA0019	SPRING,EARTH	
112	800WQ0A025	FELT SHEET	
113	800WQ00039	FELT SHEET	
114	899HV3T000	HOLDER,ANODE WIRE	
115	8994201000	HOLDER,CRT WIRE	
201	8121J50C04	SCREW,TAPPING(B0) GW15	5x30
202	8117540A64	SCREW,TAPPING(B0) TRUSS	4x16
203	8110630A04	SCREW,TAP TITE(P) BRAZIER	3x10
204	8110630804	SCREW,TAP TITE(P) BRAZIER	3x8
205	8109I30A04	SCREW,TAP TITE(B) WH7	3x10
206	8109630802	SCREW,TAP TITE(B) BRAZIER	3x8
207	8107630804	SCREW,TAP TITE(S) BRAZIER	3x8
---	723000C272	SHEET,BAR CODE	
---	791WHA0061	LAMIFILM BAG	
---	792UHA0190	PACKAGE,TOP	
---	792UHA0191	PACKAGE,BOTTOM	
---	793UCDB199	GIFT BOX	
---	A3N704C975	INSTRUCTION BOOK KIT	
---	J3N70401A	INSTRUCTION BOOK	
---	J3N70407A	QUICK SET-UP SHEET	
---	JB5XD200	POLYBAG,INSTRUCTION(RED CAUTION)	

ELECTRICAL REPLACEMENT PARTS LIST

Location	Part Number	Description		
		RESISTORS		
R003	R002T4271J	RC	270 OHM 1/4W	
R004	R002T4271J	RC	270 OHM 1/4W	
R005	R801R7823J	RC	82K OHM 1/10W	
R006	R801R7153J	RC	15K OHM 1/10W	
R007	R801R7750J	RC	75 OHM 1/10W	
R101	R801R7391J	RC	390 OHM 1/10W	
R102	R801R7821J	RC	820 OHM 1/10W	
R103	R801R7122J	RC	1.2K OHM 1/10W	
R104	R801R7222J	RC	2.2K OHM 1/10W	
R105	R801R7103J	RC	10K OHM 1/10W	
R106	R801R7103J	RC	10K OHM 1/10W	
R107	R801R7102J	RC	1K OHM 1/10W	
R108	R801R7271J	RC	270 OHM 1/10W	
R109	R002T4222J	RC	2.2K OHM 1/4W	
R110	R801R7562J	RC	5.6K OHM 1/10W	
R111	R801R7153J	RC	15K OHM 1/10W	
R112	R002T4152J	RC	1.5K OHM 1/4W	
R113	R801R7562J	RC	5.6K OHM 1/10W	
R114	R801R7472J	RC	4.7K OHM 1/10W	
R115	R801R7472J	RC	4.7K OHM 1/10W	
R116	R801R7103J	RC	10K OHM 1/10W	
R120	R801R7472J	RC	4.7K OHM 1/10W	
R121	R002T4101J	RC	100 OHM 1/4W	
R122	R801R7472J	RC	4.7K OHM 1/10W	
R123	R801R7103J	RC	10K OHM 1/10W	
R124	R801R7103J	RC	10K OHM 1/10W	
R125	R801R7472J	RC	4.7K OHM 1/10W	
R126	R801R7470J	RC	47 OHM 1/10W	
R128	R801R7101J	RC	100 OHM 1/10W	
R129	R801R7101J	RC	100 OHM 1/10W	
R131	R801R7104J	RC	100K OHM 1/10W	
R132	R801R7561J	RC	560 OHM 1/10W	
R133	R801R7103J	RC	10K OHM 1/10W	
R134	R801R7103J	RC	10K OHM 1/10W	
R136	R002T4152J	RC	1.5K OHM 1/4W	
R137	R801R7181J	RC	180 OHM 1/10W	
R140	R801R7222J	RC	2.2K OHM 1/10W	
R141	R801R7222J	RC	2.2K OHM 1/10W	
R142	R801R7222J	RC	2.2K OHM 1/10W	
R143	R801R7152J	RC	1.5K OHM 1/10W	
R144	R002T4182J	RC	1.8K OHM 1/4W	
R145	R002T4182J	RC	1.8K OHM 1/4W	
R146	R002T4182J	RC	1.8K OHM 1/4W	
R147	R002T4122J	RC	1.2K OHM 1/4W	
R148	R801R7103J	RC	10K OHM 1/10W	
R151	R801R7472J	RC	4.7K OHM 1/10W	
R152	R002T4101J	RC	100 OHM 1/4W	
R201	R801R7820J	RC	82 OHM 1/10W	
R202	R801R7561J	RC	560 OHM 1/10W	
R204	R801R7271J	RC	270 OHM 1/10W	
R206	R801R7102J	RC	1K OHM 1/10W	
R213	R002T2101J	RC	100 OHM 1/2W	
R214	R801R7222J	RC	2.2K OHM 1/10W	
R215	R801R7682J	RC	6.8K OHM 1/10W	
R217	R801R7102J	RC	1K OHM 1/10W	
R218	R801R7151J	RC	150 OHM 1/10W	
R219	R801R7102J	RC	1K OHM 1/10W	
R401	R002T2681J	RC	680 OHM 1/2W	
⚠R402	R3X18A221J	R,METAL OXIDE	220 OHM 2W	
R403	R002T4152J	RC	1.5K OHM 1/4W	
R407	R002T2010J	RC	1 OHM 1/2W	
R408	R002T4102J	RC	1K OHM 1/4W	
R409	R002T2681J	RC	680 OHM 1/2W	
⚠R410	R3X181221J	R,METAL OXIDE	220 OHM 1W	
⚠R411	R635U2680J	R,FUSE	68 OHM 1/2W	
R412	R002T4123J	RC	12K OHM 1/4W	
R413	R002T4563J	RC	56K OHM 1/4W	
R416	R002T22R2J	RC	2.2 OHM 1/2W	
R417	R4X5T6392F	R,METAL	3.9K OHM 1/6W	
R418	R002T4470J	RC	47 OHM 1/4W	
R419	R801R7391J	RC	390 OHM 1/10W	
R420	R801R7183J	RC	18K OHM 1/10W	
R421	R002T2683J	RC	68K OHM 1/2W	
R422	R002T4224J	RC	220K OHM 1/4W	
R423	R002T4224J	RC	220K OHM 1/4W	
⚠R424	R3X181102J	R,METAL OXIDE	1K OHM 1W	
R425	R002T2561J	RC	560 OHM 1/2W	

ELECTRICAL REPLACEMENT PARTS LIST

Location	Part Number	Description		
		RESISTORS		
R426	R002T2471J	RC	470 OHM 1/2W	
R427	R801R7101J	RC	100 OHM 1/10W	
R428	R002T2010J	RC	1 OHM 1/2W	
R430	R002T4104J	RC	100K OHM 1/4W	
R446	R002T2471J	RC	470 OHM 1/2W	
⚠R501	R002T2155J	RC	1.5M OHM 1/2W	
R502	R801R7103J	RC	10K OHM 1/10W	
⚠R503	R5X2AE3R9J	R,CEMENT	3.9 OHM 7W	
R507	R801R7222J	RC	2.2K OHM 1/10W	
R508	R4X5T6562F	R,METAL	5.6K OHM 1/6W	
⚠R509	R63581R22J	R,FUSE	0.22 OHM 1W	
R510	R002T4221J	RC	220 OHM 1/4W	
R511	R002T4222J	RC	2.2K OHM 1/4W	
R512	R801R7103J	RC	10K OHM 1/10W	
⚠R516	R3X1811R2J	R,METAL OXIDE	1.2 OHM 1W	
R517	R002T4152J	RC	1.5K OHM 1/4W	
R518	R002T4124J	RC	120K OHM 1/4W	
R519	R002T4271J	RC	270 OHM 1/4W	
⚠R521	R3X28BR82J	R,METAL OXIDE	0.82 OHM 3W	
R524	R002T4473J	RC	47K OHM 1/4W	
R528	R002T4103J	RC	10K OHM 1/4W	
R529	R002T4681J	RC	680 OHM 1/4W	
R530	R002T4562J	RC	5.6K OHM 1/4W	
R531	R002T2155J	RC	1.5M OHM 1/2W	
R532	R002T4223J	RC	22K OHM 1/4W	
⚠R534	R3X181331J	R,METAL OXIDE	330 OHM 1W	
R535	R002T4222J	RC	2.2K OHM 1/4W	
R536	R002T4222J	RC	2.2K OHM 1/4W	
R537	R801R7561J	RC	560 OHM 1/10W	
R538	R801R7103J	RC	10K OHM 1/10W	
R540	R801R7101J	RC	100 OHM 1/10W	
R541	R801R7273J	RC	27K OHM 1/10W	
R542	R801R7102J	RC	1K OHM 1/10W	
⚠R543	R3X28BR39J	R,METAL OXIDE	0.39 OHM 3W	
R544	R002T2682J	RC	6.8K OHM 1/2W	
R545	R002T2682J	RC	6.8K OHM 1/2W	
R546	R002T4103J	RC	10K OHM 1/4W	
R547	R002T4103J	RC	10K OHM 1/4W	
R548	R801R7103J	RC	10K OHM 1/10W	
R550	R002T2101J	RC	100 OHM 1/2W	
R552	R002T2155J	RC	1.5M OHM 1/2W	
R601	R801R7221J	RC	220 OHM 1/10W	
R602	R002T4561J	RC	560 OHM 1/4W	
R603	R801R7102J	RC	1K OHM 1/10W	
R604	R002T4101J	RC	100 OHM 1/4W	
R605	R801R7221J	RC	220 OHM 1/10W	
R606	R002T4101J	RC	100 OHM 1/4W	
R607	R801R7223J	RC	22K OHM 1/10W	
R608	R801R7473J	RC	47K OHM 1/10W	
R618	R801R7103J	RC	10K OHM 1/10W	
R619	R801R7334J	RC	330K OHM 1/10W	
R622	R801R7334J	RC	330K OHM 1/10W	
R624	R801R7103J	RC	10K OHM 1/10W	
R626	R002T4103J	RC	10K OHM 1/4W	
R628	R801R7151J	RC	150 OHM 1/10W	
R629	R801R7151J	RC	150 OHM 1/10W	
R630	R801R7151J	RC	150 OHM 1/10W	
R636	R801R7473J	RC	47K OHM 1/10W	
R638	R801R7222J	RC	2.2K OHM 1/10W	
R639	R801R7332J	RC	3.3K OHM 1/10W	
R641	R801R7102J	RC	1K OHM 1/10W	
R643	R801R7471J	RC	470 OHM 1/10W	
R645	R801R7222J	RC	2.2K OHM 1/10W	
R646	R002T4822J	RC	8.2K OHM 1/4W	
R647	R801R7102J	RC	1K OHM 1/10W	
R703	R002T4221J	RC	220 OHM 1/4W	
R704	R801R7750J	RC	75 OHM 1/10W	
R705	R801R7222J	RC	2.2K OHM 1/10W	
R706	R002T2391J	RC	390 OHM 1/2W	
R707	R002T2101J	RC	100 OHM 1/2W	
R710	R801R7222J	RC	2.2K OHM 1/10W	
R713	R002T4750J	RC	75 OHM 1/4W	
R714	R002T4680J	RC	68 OHM 1/4W	
R715	R002T4750J	RC	75 OHM 1/4W	
R716	R002T4750J	RC	75 OHM 1/4W	
R719	R002T4750J	RC	75 OHM 1/4W	
R720	R00204750J	RC	75 OHM 1/4W	

ELECTRICAL REPLACEMENT PARTS LIST

Location	Part Number	Description		
		RESISTORS		
R725	R002T2391J	RC	390 OHM 1/2W	
R726	R801R7102J	RC	1K OHM 1/10W	
R727	R801R7104J	RC	100K OHM 1/10W	
R728	R801R7104J	RC	100K OHM 1/10W	
R736	R801R7103J	RC	10K OHM 1/10W	
R737	R801R7563J	RC	56K OHM 1/10W	
R738	R801R7471J	RC	470 OHM 1/10W	
R745	R801R7104J	RC	100K OHM 1/10W	
R750	R801R7101J	RC	100 OHM 1/10W	
R802	R002T4272J	RC	2.7K OHM 1/4W	
⚠R803	R3X18A123J	R,METAL OXIDE	12K OHM 2W	
R804	R002T4272J	RC	2.7K OHM 1/4W	
⚠R805	R3X18A123J	R,METAL OXIDE	12K OHM 2W	
R806	R002T4272J	RC	2.7K OHM 1/4W	
⚠R807	R3X18A123J	R,METAL OXIDE	12K OHM 2W	
R809	R801R7472J	RC	4.7K OHM 1/10W	
R811	R801R7472J	RC	4.7K OHM 1/10W	
R813	R002T4271J	RC	270 OHM 1/4W	
R814	R801R7472J	RC	4.7K OHM 1/10W	
R815	R002T4271J	RC	270 OHM 1/4W	
R816	R801R7271J	RC	270 OHM 1/10W	
⚠R819	R6358A5R6J	R,FUSE	5.6 OHM 2W	
R1004	R002T4123J	RC	12K OHM 1/4W	
R1005	R801R7222J	RC	2.2K OHM 1/10W	
R1010	R801R7103J	RC	10K OHM 1/10W	
R1011	R903N8103J	RC	10K OHM 1/8W	
R1014	R002T4122J	RC	1.2K OHM 1/4W	
R1015	R801R7123J	RC	12K OHM 1/10W	
		CAPACITORS		
C001	CS0RB04H4K	CC	0.022 UF 50V B	
C002	E02LU0471M	CE	470 UF 6.3V	
C003	E50HU5010M	CE	1 UF 50V	
C006	CS0RCH412J	CC	100 PF 50V CH	
C007	CS0RB0414K	CC	0.01 UF 50V B	
C101	CS0RCH4U1J	CC	68 PF 50V CH	
C102	CS0RB0315K	CC	0.1 UF 25V B	
C103	CS0RCH4H1J	CC	22 PF 50V CH	
C104	CS0RB04Q3K	CC	0.0047UF 50V B	
C105	CS0RB0315K	CC	0.1 UF 25V B	
C106	CS0RB04H4K	CC	0.022 UF 50V B	
C108	CS0RCH4H1J	CC	22 PF 50V CH	
C109	CS0RCH4H1J	CC	22 PF 50V CH	
C111	CS0RF02Q5Z	CC	0.47 UF 16V F	
C112	CS0RCH4W1J	CC	82 PF 50V CH	
C113	CS0RCH4H1J	CC	22 PF 50V CH	
C114	CS0RB0315K	CC	0.1 UF 25V B	
C115	E02LT0222M	CE	2200 UF 6.3V	
C116	CS0RB04Q3K	CC	0.0047UF 50V B	
C118	CS0RB0315K	CC	0.1 UF 25V B	
C119	CS0RB0315K	CC	0.1 UF 25V B	
C120	CS0RB0216K	CC	1 UF 16V B	
C121	E02LU0101M	CE	100 UF 6.3V	
C122	E50HU2100M	CE	10 UF 16V	
C125	CS0RCH412J	CC	100 PF 50V CH	
C126	CS0RCH412J	CC	100 PF 50V CH	
C127	CS0RCH412J	CC	100 PF 50V CH	
C128	CS0RCH4E2J	CC	150 PF 50V CH	
C129	CS0RCH4H2J	CC	220 PF 50V CH	
C131	E50HU2100M	CE	10 UF 16V	
C132	CS0RCH431J	CC	30 PF 50V CH	
C139	CS0RF02Q5Z	CC	0.47 UF 16V F	
C140	CS0RCH4H2J	CC	220 PF 50V CH	
C141	CS0RB0315K	CC	0.1 UF 25V B	
C143	CS0RB0315K	CC	0.1 UF 25V B	
C201	CS0RCH430C	CC	3 PF 50V CH	
C202	CS0RB0413K	CC	0.001 UF 50V B	
C203	CS0RB04H4K	CC	0.022 UF 50V B	
C204	CS0RB0413K	CC	0.001 UF 50V B	
C205	CS0RB0413K	CC	0.001 UF 50V B	
C206	CS0RB0216K	CC	1 UF 16V B	
C207	CS0RF04L5Z	CC	0.33 UF 50V F	
C209	E50HU2100M	CE	10 UF 16V	
C210	CS0RB0216K	CC	1 UF 16V B	
C212	CS0RB0414K	CC	0.01 UF 50V B	
C213	CS0RB0216K	CC	1 UF 16V B	
C215	CS0RB0315K	CC	0.1 UF 25V B	
C217	E02LU2470M	CE	47 UF 16V	

ELECTRICAL REPLACEMENT PARTS LIST

Location	Part Number	Description		
		CAPACITORS		
C218	CS0RB04H4K	CC	0.022 UF 50V B	
C220	E02LU1471M	CE	470 UF 10V	
C221	CS0RB0315K	CC	0.1 UF 25V B	
C403	E02LT4471M	CE	470 UF 35V	
C404	E02LTD2R2M	CE	2.2 UF 250V	
C407	P235W1104J	CMP	0.1 UF 100V MKT	
C408	E02LU5100M	CE	10 UF 50V	
C412	P232T0473J	CMPL	0.047 UF 50V MMTV	
⚠C414	E02LU4101M	CE	100 UF 35V	
C417	E02LU5220M	CE	22 UF 50V	
C418	E02LF3102M	CE	1000 UF 25V	
C422	P235W1474J	CMP	0.47 UF 100V MKT	
C437	P4J7F3274J	CMPP	0.27 UF 250V PMS	
C440	P232W1103J	CMP	0.01 UF 100V MMTS	
C442	P4N8FJ113H	CMPP	0.011 UF 1.25KV	
⚠C446	E02LU5220M	CE	22 UF 50V	
⚠C448	E0ELFD220M	CE	22 UF 250V	
⚠C501	P2122B224M	CMP	0.22 UF 275V ECQUL	
C502	CS0RB0216K	CC	1 UF 16V B	
C503	E02LT8100M	CE	10 UF 100V	
C504	CS0RB0413K	CC	0.001 UF 50V B	
⚠C505	E52DHH820M	CE	82 UF 400V	
C506	C0JBB0713K	CC	0.001 UF 2KV B	
C507	C0JBB0713K	CC	0.001 UF 2KV B	
C508	CS0RB0414K	CC	0.01 UF 50V B	
C509	CS0RB0414K	CC	0.01 UF 50V B	
C511	E02LF2222M	CE	2200 UF 16V	
C515	E02LT2102M	CE	1000 UF 16V	
C517	C0PLRR7B3K	CC	0.0012 UF 2KV R	
C518	E02LU54R7M	CE	4.7 UF 50V	
C522	E50HU2100M	CE	10 UF 16V	
C523	E02LU1221M	CE	220 UF 10V	
C524	CS0RB0414K	CC	0.01 UF 50V B	
⚠C525	CD39E0M13M	CC	0.001 UF 250V	
⚠C526	P2122B224M	CMP	0.22 UF 275V ECQUL	
C530	CS0RB0315K	CC	0.1 UF 25V B	
! C531	E5EZF4102M	CE	1000 UF 35V	
C532	C03L0R7K3K	CC	0.0027UF 2KV R	
C533	E02LU0221M	CE	220 UF 6.3V	
C536	P232T0473J	CMPL	0.047 UF 50V MMTV	
C537	P23200474J	CMP	0.47 UF 50V MMT	
C539	E02LU5100M	CE	10 UF 50V	
⚠C540	CD39E0MH3M	CC	0.0022UF 250V	
C541	E62NFB101M	CE	100 UF 160V	
C543	CS0RB0413K	CC	0.001 UF 50V B	
C602	CS0RB0216K	CC	1 UF 16V B	
C603	CS0RB0216K	CC	1 UF 16V B	
C604	CS0RF0316Z	CC	1 UF 25V F	
C605	CS0RB0216K	CC	1 UF 16V B	
C607	CS0RB0216K	CC	1 UF 16V B	
C608	CQGTB0415K	CC	0.1 UF 50V B	
C609	CS0RB0315K	CC	0.1 UF 25V B	
C610	E02LU0101M	CE	100 UF 6.3V	
C611	E50HU53R3M	CE	3.3 UF 50V	
C612	CS0RB04E3K	CC	0.0015UF 50V B	
C613	E02LU1471M	CE	470 UF 10V	
C614	CS0RB0216K	CC	1 UF 16V B	
C615	CS0RB0216K	CC	1 UF 16V B	
C616	CS0RB04Q3K	CC	0.0047UF 50V B	
C617	E02LU52R2M	CE	2.2 UF 50V	
C618	CQGTB0415K	CC	0.1 UF 50V B	
C619	CS0RB0315K	CC	0.1 UF 25V B	
C620	CQGTB0415K	CC	0.1 UF 50V B	
C621	E50HU2100M	CE	10 UF 16V	
C622	CQGTB0415K	CC	0.1 UF 50V B	
C623	CS0RB0315K	CC	0.1 UF 25V B	
C626	CS0RB0315K	CC	0.1 UF 25V B	
C633	CS0RB0414K	CC	0.01 UF 50V B	
C634	E00NU2100M	CE	10 UF 16 V	
C635	E02LU5100M	CE	10 UF 50V	
C638	CQGTB0414K	CC	0.01 UF 50V B	
C711	E02LU1221M	CE	220 UF 10V	
C715	E50HU2100M	CE	10 UF 16V	
C716	CS0RCH412J	CC	100 PF 50V CH	
C719	CS0RCH412J	CC	100 PF 50V CH	
C721	CS0RCH412J	CC	100 PF 50V CH	
C724	CS0RB0414K	CC	0.01 UF 50V B	

ELECTRICAL REPLACEMENT PARTS LIST

Location	Part Number	Description		
		CAPACITORS		
C725	E02LU1101M	CE	100 UF 10V	
C726	CS0RCH4Q2J	CC	470 PF 50V CH	
C727	CS0RCH4Q2J	CC	470 PF 50V CH	
C731	CS0RB0414K	CC	0.01 UF 50V B	
C733	E00NU2100M	CE	10 UF 16 V	
C736	CS0RB0216K	CC	1 UF 16V B	
C741	E50HU2100M	CE	10 UF 16V	
C742	E50HU2100M	CE	10 UF 16V	
C753	CS0RCH4Q2J	CC	470 PF 50V CH	
C754	CQGTCH4Q2J	CC	470 PF 50V CH	
C757	E02LU1101M	CE	100 UF 10V	
C759	CS0RB0413K	CC	0.001 UF 50V B	
C802	C0JBB0713K	CC	0.001 UF 2KV B	
C809	CQGTCH4Q2J	CC	470 PF 50V CH	
C810	CS0RCH4Q2J	CC	470 PF 50V CH	
C811	CQGTCH4Q2J	CC	470 PF 50V CH	
C1003	E00NU52R2M	CE	2.2 UF 50V	
C1004	E02LU5220M	CE	22 UF 50V	
C1008	E5EZU5100M	CE	10 UF 50V	
C1009	E02LF3102M	CE	1000 UF 25V	
C1010	CS0RB04U3K	CC	0.0068UF 50V B	
C1012	CS0RB04U3K	CC	0.0068UF 50V B	
C1013	E02LU4101M	CE	100 UF 35V	
C1014	E02LT4471M	CE	470 UF 35V	
		DIODES		
D001	D97U03301B	DIODE,ZENER	MTZJ33B T-77	
D101	0021721150	LED	SLR-342VCT32	
D102	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77	
D103	0021E5Q210	LED	LTL-1CHGE-002A	
D108	D1VT001330	DIODE,SILICON	1SS133T-77	
D401	D97U03001B	DIODE,ZENER	MTZJ30B T-77	
D402	D97U03001B	DIODE,ZENER	MTZJ30B T-77	
D403	D2WT011E10	DIODE,SILICON	11E1-EIC	
D404	D2WT011E10	DIODE,SILICON	11E1-EIC	
⚠D405	D2WTAU02A0	DIODE,SILICON	AU02A-EIC	
D406	D2WT011E10	DIODE,SILICON	11E1-EIC	
D408	D28XQS04N0	DIODE,SCHOTTKY	11EQS04N-TA2B5	
⚠D410	D2WTAU02A0	DIODE,SILICON	AU02A-EIC	
⚠D501	D2WTRM11C0	DIODE,SILICON	RM11C-EIC	
⚠D502	D2WTRM11C0	DIODE,SILICON	RM11C-EIC	
⚠D503	D2WTRM11C0	DIODE,SILICON	RM11C-EIC	
⚠D504	D2WTRM11C0	DIODE,SILICON	RM11C-EIC	
D505	D2WT011E10	DIODE,SILICON	11E1-EIC	
D506	D1VT001330	DIODE,SILICON	1SS133T-77	
D507	D1VT001330	DIODE,SILICON	1SS133T-77	
D508	D1VT001330	DIODE,SILICON	1SS133T-77	
D509	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77	
D511	D97U01201B	DIODE,ZENER	MTZJ12B T-77	
D512	D2WXSB1400	DIODE,SCHOTTKY	SB140-EIC	
D513	D2WXB290S0	DIODE,SILICON	SB290S	
D514	D1VT001330	DIODE,SILICON	1SS133T-77	
D515	D2WXSB1400	DIODE,SCHOTTKY	SB140-EIC	
⚠D516	D2WXB290S0	DIODE,SILICON	SB290S	
D517	D2WXN49370	DIODE,SILICON	1N4937	
D519	D1VT001330	DIODE,SILICON	1SS133T-77	
D520	D28F30DF60	DIODE,RECTIFIER	30DF6-FC	
D521	D1VT001330	DIODE,SILICON	1SS133T-77	
D525	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77	
! D526	D2CF2016L0	DIODE,SILICON	FE201-6L49	
D527	D2WT011E10	DIODE,SILICON	11E1-EIC	
⚠D528	D97U01801B	DIODE,ZENER	MTZJ18B T-77	
D530	D1VT001330	DIODE,SILICON	1SS133T-77	
D531	D97U01501B	DIODE,ZENER	MTZJ15B T-77	
D532	D2WXN49370	DIODE,SILICON	1N4937	
D533	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77	
D601	D1VT001330	DIODE,SILICON	1SS133T-77	
D603	D1VT001330	DIODE,SILICON	1SS133T-77	
D604	D2WT011E10	DIODE SILICON	11E1-EIC	
D605	D97U06R21B	DIODE,ZENER	MTZJ6.2B T-77	
D609	D2WXSB1400	DIODE,SCHOTTKY	SB140-EIC	
D712	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77	
D804	D1VT001330	DIODE,SILICON	1SS133T-77	
D805	D1VT001330	DIODE,SILICON	1SS133T-77	
D806	D1VT001330	DIODE,SILICON	1SS133T-77	
D1001	D1VT001330	DIODE,SILICON	1SS133T-77	
		ICS		
IC101	I5PD0F012A	IC	OECF012A	

ELECTRICAL REPLACEMENT PARTS LIST

Location	Part Number	Description		
		ICS		
IC102	I9UF032310		IC	PST3231NR
IC199	I5HJ004BF0		IC	S-24C04BFJ-TB
IC201	I0WDE2246E		IC	STV2246E
⚠IC401	I0WTD81740		IC	TDA8174A
IC502	I1KA98R09A		IC	KIA78R09API
IC503	I1KA98R060		IC	KIA278R06PI
⚠IC506	0002E00610		PHOTO COUPLER	LTV-817M-VB
IC701	I0UF015010		IC	MM1501XNRE
IC1002	I0FSP52760		IC	AN5276
		TRANSISTORS		
Q102	T6YJ1037K0		TRANSISTOR,SILICON	2SA1037AKT146R,S
Q103	T6YJ1037K0		TRANSISTOR,SILICON	2SA1037AKT146R,S
Q201	T8AA03881S		TRANSISTOR,SILICON	KTC3881S-RTK
Q204	T8YJ2412K0		TRANSISTOR,SILICON	2SC2412KT146 R,S
Q401	TDUU024990		TRANSISTOR,SILICON	2SD2499(LB0EC1)
Q402	TC5T01627Y		TRANSISTOR,SILICON	2SC1627_Y(TPE2)
Q403	TNYJB05001		COMPOUND TRANSISTOR	DTC114EKAT146
⚠Q501	T41F026510		TRANSISTOR,FIELD EFF	ECT 2SK2651-01MR
⚠Q502	TCAT032034		TRANSISTOR,SILICON	KTC3203_Y-AT
Q503	T6YJ1037K0		TRANSISTOR,SILICON	2SA1037AKT146R,S
Q505	TCAT032034		TRANSISTOR,SILICON	KTC3203_Y-AT
Q507	TCATC31980		TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q508	TNYJJ05001		COMPOUND TRANSISTOR	DTC114TKAT146
Q509	TA3T016240		TRANSISTOR,SILICON	2SA1624-AA
Q510	TNYJC05001		COMPOUND TRANSISTOR	DTC124EKAT146
Q511	TAAT01281Y		TRANSISTOR,SILICON	KTA1281_Y
Q512	TPYJB05001		COMPOUND TRANSISTOR	DTA114EKAT146
Q513	TA3T1371A0		TRANSISTOR,SILICON	2SA1371(D,E)-AE
Q514	TC3T029090		TRANSISTOR,SILICON	2SC2909(S,T)-AA
Q601	T8YJ2412K0		TRANSISTOR,SILICON	2SC2412KT146 R,S
Q609	T8YJ2412K0		TRANSISTOR,SILICON	2SC2412KT146 R,S
Q702	T8YJ2412K0		TRANSISTOR,SILICON	2SC2412KT146 R,S
Q703	T8YJ2412K0		TRANSISTOR,SILICON	2SC2412KT146 R,S
⚠Q804	TCA0042170		TRANSISTOR,SILICON	KTC4217(O,Y)
⚠Q805	TCA0042170		TRANSISTOR,SILICON	KTC4217(O,Y)
⚠Q806	TCA0042170		TRANSISTOR,SILICON	KTC4217(O,Y)
Q1002	TPAAC05002		COMPOUND TRANSISTOR	KRA103SRTK
		COILS &TRANSFORMERS		
L001	02167F100J		COIL	10 UH
L101	02167F100J		COIL	10 UH
L102	02167F100J		COIL	10 UH
L202	033700005R		COIL,VIDEO IFT	3700005
L203	021LA61R5K		COIL	1.5 UH
L204	021LA6150K		COIL	15 UH
L206	021LA6R27M		COIL	0.27 UH
L207	021LA6100J		COIL	10 UH
L208	02167F3R3J		COIL	3.3 UH
L401	021679472K		COIL	4.7 MH
L403	022800033A		COIL,LINEARITY	20416A
⚠L501	029T000091		COIL,LINE FILTER	0R8A393F28Y
L502	02AHB9A972		CORE,FERRITE	W5T29X7.5X19
⚠L503	028R140027		COIL,DEGAUSS	8R140027
L601	02167F100J		COIL	10 UH
L704	021LA6220J		COIL	22 UH
L706	021LA6220J		COIL	22 UH
L707	021LA6220J		COIL	22 UH
L708	021LA6220J		COIL	22 UH
L711	021LA6220J		COIL	22 UH
L713	021LA6220J		COIL	22 UH
L715	021LA6100J		COIL	10 UH
L717	021LA6100J		COIL	10 UH
L801	02167F101J		COIL	100 UH
T401	045009003J		TRANS,HORIZONTAL DRIVE	ETH09K14BZ
⚠T501	0481350864		TRANSFORMER,SWITCHING	81350864
		JACKS		
J701	063G100042		SOCKET,21PIN	0350_9982_05
J702	060J131015		HEADPHONE JACK	MSJ-2000
J703	060G401047		RCA JACK	HTJ-032-03AY
J704	060G401046		RCA JACK	HTJ-032-03AW
⚠J801	066F120018		SOCKET,CATHODE RAY TUBE	ISMS01S
		SWITCHES		
SW102	0504101T34		SWITCH,TACT	EVQ21505R
SW104	0504101T34		SWITCH,TACT	EVQ21505R
SW106	0504101T34		SWITCH,TACT	EVQ21505R
SW107	0504101T34		SWITCH,TACT	EVQ21505R
⚠SW501	0530105019		SWITCH	ESB92S22B

ELECTRICAL REPLACEMENT PARTS LIST

Location	Part Number	Description	
		VARIABLE RESISTORS	
VR401	V1K63H3BTE	VOLUME,SEMI FIXED	NVG6TLTAB222
VR420	V1K62Q2BT8	VOLUME,SEMI FIXED	NVG6THTB471
VR501	V1163H3BTC	VOLUME,SEMI FIXED	EVNCYAA03BE3
		P.C.BOARD ASSEMBLIES	
PCB010	A3N704C010K	PCB ASS'Y	TMC572B
PCB110	A3N704C110K	PCB ASS'Y	TCC433B
		MISCELLANEOUS	
ANT001	125C500017	ANTENNA,LOOP	TU-33AP
B501	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
B504	024HT03564	CORE,BEADS	W4BRH3.5X6X1.0
B701	024HT03564	CORE,BEADS	W4BRH3.5X6X1.0
B702	024HT03564	CORE,BEADS	W4BRH3.5X6X1.0
BT001	1412004013	BATTERY,MANGAN	R03(AB)2PXGPI
BT002	1412004013	BATTERY,MANGAN	R03(AB)2PXGPI
⚠CD501	1206635826	CORD,AC BUSH	6635826
CD801	1278150005	BRAIDED WIRE	SM1510-002-1A
CD802	WDL6034038	FLAT CABLE AWM2468 A	WG26 6C BLACK 340MM
CD803	WBL6030038	FLAT CABLE AWM2468 A	WG26 4C BLACK 300MM
CF201	1012T6R014	FILTER,CERAMIC TRAP	TPSRA6M00B00-A0
CF202	102E239R5B	FILTER,SAW	J1951M
CP001	069W01001A	CONNECTOR PCB SIDE	003P-2100
CP101	069X160379	CONNECTOR PCB SIDE	06JQ-ST
CP401	069S450089	CONNECTOR PCB SIDE	A1561WV2-A5P
CP501	069S320419	CONNECTOR PCB SIDE	A3963WV2-3PD
CP502	069S420110	CONNECTOR PCB SIDE	A1561WV2-2P
CP801	069S320010	CONNECTOR PCB SIDE	A2361WV2-2P
CP806	069W010010	CONNECTOR PCB SIDE	005P-2100
CP1002	069S120419	CONNECTOR PCB SIDE	A2502WV2-2P
CP802A	067U006049	WIRE HOLDER	B2013H02-6P
CP802B	067U006049	WIRE HOLDER	B2013H02-6P
CP803A	067U004029	WIRE HOLDER	B2013H02-4P
CP803B	067U004029	WIRE HOLDER	B2013H02-4P
EL001	124116281A	EYE LET	XRY16X28BD
EL002	124120301A	EYE LET	XRY20X30BD
⚠F501	080NT04004	FUSE	50T040H
⚠FB401	043214035F	TRANSFORMER,FLYBACK	FQI-14B003F
FH501	06710T0006	HOLDER,FUSE	EYF-52BC
FH502	06710T0006	HOLDER,FUSE	EYF-52BC
⚠ICP501	0845T07003	IC PROTECTOR	20P_7000
⚠ICP502	0845T03003	IC PROTECTOR	20P_3000
OS101	0773071001	REMOTE RECEIVER	RPM7138-H5
⚠RY501	0560V20115	RELAY	ALKS321
SP353	070C434001	SPEAKER	C109-47-148A
⚠TH501	D8E080A100	DEGAUSS ELEMENT	B59209-J80-A10
TM101	076N0GX010	TRANSMITTER	RC-GX010
TU001	0144507035	TUNER,UHF	TUWRF4EK-778F2A
⚠V801	098Q150402	CRT W/DY	A36AKJ13X02
X101	100CT4R013	CRYSTAL	HC-49/U-S
X601	100CT4R408	CRYSTAL	HC-49/U
X602	100CT3R509	CRYSTAL	HC-49/U

RESISTOR

RC.....	CARBON RESISTOR

CAPACITORS

CC.....	CERAMIC CAPACITOR
CE.....	ALUMI ELECTROLYTIC CAPACITOR
CP.....	POLYESTER CAPACITOR
CPP.....	POLYPROPYLENE CAPACITOR
CPL.....	PLASTIC CAPACITOR
CMP.....	METAL POLYESTER CAPACITOR
CMPL.....	METAL PLASTIC CAPACITOR
CMPP.....	METAL POLYPROPYLENE CAPACITOR

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